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ABSTRACT

This document consists of the first four issues of a newsletter entitled "Edutopia." The name Edutopia signifies a version of what a technology-enriched educational system of the future would look like. The newsletter is intended to facilitate the integration of interactive multimedia and telecommunications technologies with teaching and learning and to keep interested colleagues up-to-date with the research and activities in this regard of the George Lucas Educational Foundation. Among the feature articles appearing in these four issues are: (1) "A Design for the Information Age: Benjamin F. Butler Middle School" (Laura Ann Wernick and Steven Arnoff); (2) "Learning and School Environments" (Gary T. Moore); (3) "A Blueprint for Making Learning Real: Lincoln High West Campus" (Linda Meyers); (4) "Kids Online: Do Something Constructive" (Brenda Laurel); (5) "Technology Assists People with Disabilities" (Russ Holland); (6) "Free Telecommunications for all Children" (Richard Riley). (MAS/FAC)

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ED 390 374

# Edutopia

1993-1995

by George Lucas Foundation

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

V 94 NICASIO, CA

EDUTOPIA™

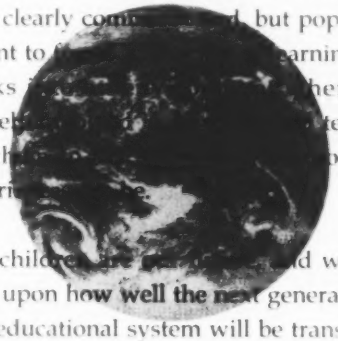
THE NEWSLETTER OF THE GEORGE LUCAS FOUNDATION

**...pia is the name we use to describe a ... of what a technology-enriched educa... system of the future could look like. ...ented around the intellectual, physi... ...ional well-being of all students ... a series of four, half-h... ...ving vivid images of ...**

dra... syste... throughо... can't realize h...

My own experience in public ... frustrating; I was often bored and felt I didn't fit in. Occasionally I had a teacher who engaged my curiosity, and I kept thinking, "Why can't education be exciting all the time?" Now that I have children of my own, I don't want them to go through the same thing I did. I want them to be driven by their curiosity and excited about learning all the time.

While I recognize there is no one answer to the problems of education, at the Foundation we are trying to put some of the best ideas into a form that will be not only clearly com... d, but popularized as well. I want to ... earning. Anyone who walks ... here students are activel... teachers are guiding th... ow powerful the experi... e.



Our childre... d we are all dependent upon how well the next generation is educated. The educational system will be transformed through the natural forces of change anyway, but through our work and the work of others who share a common vision, we're hoping to help make these changes happen faster.

GEORGE LUCAS

## LETTER FROM THE CHAIRMAN

...IEWS ON EDUCATION AND INNOVATION

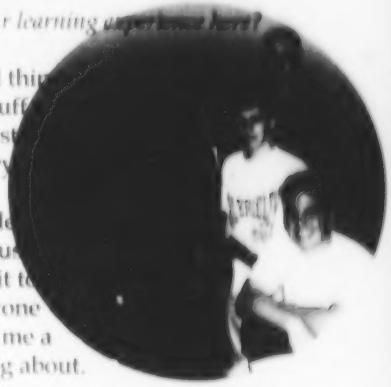
## INTERVIEW

...ke with six students from around the world ...ent the summer working as Explainers at the ...ium, an interactive science museum located in San Francisco, CA.

*What is an Explainer?*

**WES:** Explainers basically run the floor of the museum. We roam around, and if people have any questions about the exhibits, we answer them, or sometimes we approach visitors to give them basic information.

*What is unique about your learning ...*



**SUSANNA:** One of the good thi... you have to explain the stuff... know it very well and unders... very...

**BEN:** It gives me a better ide... what the concepts are becau... have to actually explain it t... people in a way that everyone ... can understand —it gives me a better idea of what I'm talking about.

**DAVE:** It gives me a deep sense of satisfaction after learning that somebody understands. I've gotten through to somebody...and they're like, "I understand this."

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# Discussions About the Future

CONNECTIONS – This is what everyone seems to be talking about these days. Whether it's connecting ideas or individuals in print, online or face to face, making connections and establishing relationships are vitally important in today's global community. By publishing newsletters and producing a series of videos and a resource document, the Foundation is playing a role in connecting people to ideas and to one another.

With *Edutopia*, we are working to provide useful information and to keep interested colleagues up to date with our progress. This first publication features articles on telecommunications and information access, as well as students' comments on teaching and learning. Additionally, *Edutopia* provides a list of organizations actively involved with critical issues in education and technology. We encourage our readers to contact us and to keep us informed of their work so that we may continue to help link people and ideas.

The Foundation is currently developing a series of dramatic videos that represent an effective educational system in a world with ubiquitous technology. The proposed videos, scheduled to begin production in 1994, will depict students of all ages engaged in challenging and meaningful learning experiences facilitated by a supportive system and public policies that make education a priority. A document accompanying the videos will provide practical information about research, policy, and program implementation, as well as make available directories of resources, experts, and models.

To help envision a system, the Foundation seeks out individuals and organizations dedicated to

improving education, technology, and research. We have developed relationships with these respected individuals through attendance at conventions, roundtable sessions, and individual discussions. Some of the experts join us at Skywalker Ranch for meetings that cover topics ranging from an underlying philosophy for an equitable educational system to specific designs for technology-rich learning environments. The open exchange of ideas among experts is helping inform the research for the videos and shape plans for the accompanying document. And fortuitously, the meetings provide a forum for conversation among professionals who don't often have the opportunity to discuss these issues with each other.

While most of the experts acknowledge the complexity of the problems, numerous areas of consensus emerge. One is that there are many good things happening today in individual classrooms and schools across the country. Exemplary projects include simulated archeology excavations, model-city building, and socially responsible activities facilitated by global telecommunications. Another area of agreement is that emerging technologies will continue to change the way we live, learn, and work. If our society is to thrive in this new age, the entire educational system must be transformed to meet the needs of our diverse learning community.

We know there is no single answer to the problems confronting education, but we are confident that if enough people work together, we can make a difference. It is our hope that the videos and document will act as catalysts, first by giving people a common language with which to discuss the possibilities, and second by providing images and information that can be used by people committed to change.

## Kids Online:

# DO SOMETHING CONSTRUCTIVE!

From electronic bulletin boards to online chats to information services to shared fantasyworlds, young people are beginning to have access to a variety of computer networking environments and activities. What new opportunities for learning and creativity does computer networking afford?

The failure of early attempts at computer networking for educational purposes is probably due to the strong constraints on what one could do. A kid could download and complete a computer-based activity, but there was no e-mail, no chats, no way for kids to communicate with experts or with one another online. It was the golden age of drill and practice in the world of CAI (Computer-Aided Instruction), and the absence of a social dimension made the CAI experience little more than online worksheets. No one had yet discovered the thing that makes networking so attractive: the ability to communicate. This was especially ironic in the context of PLATO, where adult users spent a disproportionate amount of their time eagerly posting rants and having enthusiastic conversations in topic-oriented special-interest groups and sending one another reams of e-mail.

By contrast, more recent experiments like Computer-Supported Intentional Learning Environments (CSILE), a networked database designed by a researcher at the Ontario Institute for Studies in Education, have taken advantage of the enthusiasm that kids bring to communication. CSILE is a networked database specifically supporting collaborative knowledge building. As part of the CSILE experiment, kids in different grades

*continued on page 6*



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There is now widespread agreement that key qualities of successful schooling are quite different from those that have long characterized traditional education. Educational content and methods courses for teachers generally predate the highly engaged, interactive, and individualized classrooms now desired and the ways new technologies can be enlisted to support this kind of learning.

Because these classrooms are increasingly resource intensive -- relying on substantially more information sources, more discussion and argument, more guidance, and more cooperation with people -- we believe that this form of schooling cannot be achieved without the creative integration of computational, visual, and communications technologies. It has also become clear over the past decade that simple motivational and short-workshop schemes are vastly insufficient to enable veteran (and even new, computer-generation) teachers to teach differently, and to teach well with technologies.

**THE MOST HIGHLY RATED INCENTIVES FOR TELECOMMUNICATIONS FOR *STUDENT* [illegible] WERE OPENING UP THE WORLD FOR [illegible] (MEAN OF 5.5 ON 6-POINT SCALE), [illegible] NOT OTHERWISE [illegible] AND IMPROVING THEIR [illegible] (5.0).**

Telecommunications technologies have a vital role to play in realizing new circumstances in classrooms, and for the professional development of teachers. Considerable attention and investment are now being directed to bringing classrooms "online." By providing schools pipelines that enable students to draw in distant information and to interact with experts and students around the world, the problem of resource-intensity in these new classrooms might be solved. But access to pipelines is only one, albeit very challenging, component of the problem. What happens at each end of the pipeline is also crucial, and far less attention and investment have been devoted to end-of-pipeline issues, thus far. The organization of remote databases to be actually usable by novices and the design of tools that support inquiry into them are key parts of a successful education resource system. For instance, even if students have *access* to real scientific databases, or to archives of visual materials, unless the resources are organized so that novices can easily browse and search, inquire into, and understand limits of the databases, they are not well used in classrooms. Likewise, if the access to connectivity is not well incorporated in classroom curriculum and activities, it will have little important impact.

In a nationwide survey conducted by the Center for Technology in Education, teachers report a number of benefits from using telecommunications technology with their students. These include expanding students awareness about the world in general, accessing information that would otherwise be difficult to obtain, and increasing students' inquiry-based and analytical skills.

Teachers also report a number of factors that influence the success of student-based telecommunications activities. When teachers are using networks to carry out classroom exchange projects, advanced planning and full cooperation of all participating teachers is viewed as important to the project's success. The scope and content of the activity need to be well defined, as do project goals and objectives. And, as with any technology project that is designed to support and enhance student learning, the relevance of the telecommunications activity to the teacher's ongoing curriculum is important.

**THE MOST HIGHLY RATED INCENTIVE FOR TELECOMMUNICATIONS AS A PROFESSIONAL TOOL WERE COMMUNICATION WITH OTHER [illegible] OF 5.4 ON A 6-POINT SCALE), ACCESS [illegible] (5.1) AND COMBATTING PROFESSIONAL ISOLATION [illegible]**

To be well used, these resources, like new approaches to learning in general, require new designs for professional development. The national teaching force is being asked to do its job in substantially different ways.

Telecommunications has a key role to play here as well. To support, sustain, and continue to critique teaching and learning vigorously, there needs to be an entirely new professional development culture in this country. In 1993, teachers are still isolated in their classrooms, telephones remain rare, and opportunities for significant professional exchange and growth are very limited and often ill-designed. Professional development seldom goes beyond single workshops or stand-alone summer institutes. A true professional teaching culture requires sustained and regular conversation among practitioners and other experts throughout the year, and ready access to remote resources. It appears vital that teachers communicate with other practitioners and experts before, during, and after they have tried new techniques in their classrooms.

The traditional conditions of the teaching profession have bound practitioners to professionally isolating days, and careers. Now is a moment when this *can* change, and change quickly.

Telecommunications is a natural medium for the development of a basic communications structure that must undergird a professional culture. It offers a promising way to overcome the barriers of time, space, and resource access that have kept teachers in severe isolation from one another, and from the conditions necessary to support experimentation and critique. It is only when teachers can look at others' practices, discuss successes and problems in local situations, and get advice from more seasoned professionals that they can adapt and become generative with new practices.

To order a copy of *Telecommunications and K-12 Educators: Findings from a National Survey*, write to Bank Street Bookstore, 610 West 112th Street, New York, NY 10025, or call 212-678-1654.

Center for Children and Technology © 1993

JAN HAWKINS IS DIRECTOR AND MARGARET HONEY IS ASSOCIATE DIRECTOR OF THE CENTER FOR CHILDREN AND TECHNOLOGY (CCT) AT THE EDUCATION DEVELOPMENT CENTER (EDC), NEW YORK.

*continued from page 3*

in a school in Oakland, CA, were paired as online partners. Together they explored various topics, from science to ethics. Through online conversations they were able to construct many things: discourses, relationships, and communities. Anne Nicol Thomas, an independent researcher and interface expert in the world of children and computers, captured a key aspect of CSILE culture on videotape. A female African-American fourth-grader just discovered that the partner with whom she had been working online was a sixth-grade Asian male. She seemed markedly uninterested in exploring her partner's "true identity." These "facts" were incidental to the main event -- the relationship that they had already established based on matters of mind, heart, and imagination.

In the past year or so, MUDs (Multi-User Dimensions) have begun to capture the imaginations of adults and children in many places in the world. A MUD is a text-based world inhabited by online participants who can connect from any computer with a modem. MUDs are places made of text, usually beginning with some "pre-authored" features like rooms and buildings and connections between them.

In a MUD, one may construct both a representation of a physical environment and a representation of oneself that may be quite different from the "actual" world, body, and culture in which one lives. Amy Bruckman, a researcher at the MIT Media Lab and developer of MediaMOO (A "MUD Object-Oriented" for media researchers), is constructing a MUD exclusively for children. Bruckman proposes to investigate children's constructive activities more thoroughly, including gender differences in communication, narrative activity, and the construction of self-representations.

If there is a cautionary note to be sounded, then this is it. We must resist the temptation to see computer networks for kids as simply an alternative distribution channel for highly produced computer-game products that bring their own constraints, cultures, and implicit worldviews along with them. Current business ventures in developing networks for kids see liaisons with established content providers -- game and entertainment companies -- as the key to success in the mass marketplace. There is nothing wrong with produced "content," but there is plenty that is wrong with turning computer networks into virtual arcades or interactive TV-- both forms of broadcast culture. So far, computer networks have been a place where kids can experiment with the grand human activities of constructing communities and selves -- indeed, these are the primary activities of adolescents the world over. It seems crucial in these turbulent and fragmented times to have such laboratories for re-understanding our cultural and personal values -- and for rediscovering how much of "reality" we actually invent all along.

The danger of the broadcast paradigm is that it can displace or even preclude constructive activities by individuals and groups -- activities that are never meant to compete in the global marketplace as products or art, but are essential tools in understanding ourselves and communicating with others. There are two strong forms of protection against the domination of a broadcast paradigm that we can build into the networks of the future. One is to enhance continually the ability of people to communicate -- one-on-one and in small or large groups -- with each other on the net. In the "multimedia age," this means the ability to share not only words, but images and sounds of all kinds.

The second way to keep the broadcast culture in check is to provide tools that will facilitate self-expression through the creation of content. Not everyone is an artist, but the things we share with our friends, in both actual and virtual worlds, tend to be both more personal and more ephemeral than a novel or a feature film -- and this aspect changes the standards by which we evaluate their dramatic excellence and production values.

Media theorist Ivan Illych articulated an ideal he called "conviviality": the notion that it should be as easy to author in a medium as it is to experience works created in it. I think we should keep this ideal at the front of our minds as we build the next generation of computer networks. Maintaining a balance between the delivery of strong content and the ability to create and disseminate content of one's own is the key to realizing the promise of computer networks as environments for learning, creativity, cultural revitalization, and personal growth.

Brenda Laurel © 1993



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*continued from page 1*

**ORI:** One of the things that I think that the Exploratorium does that the school doesn't is allow you to have that self-taught experience. School is always taught in a group, but life, you face alone. The one thing the Exploratorium does through exhibits is the self-taught thing, particularly in the area of technology. It's kind of like crossing that barrier of group learning into self-learning and individualized learning as well.

**IZZY:** We got to feel that we were actually doing something for ourselves. You get to learn a lot just by the hands-on experience. That's really important. You also get to learn from your peers, which is really cool, too. You get to teach each other stuff and learn stuff from each other. The thing that bothers me is that a lot of the visitors seem to want quick answers and not all the exhibits can give them that. I mean, the Exploratorium isn't like a one-way street. You have to give, too, if you want to get anything out of it. Because, sure, it's fun to walk around and look at everything, but if you want to learn anything, then you have to put at least a little bit of effort into it.

*What are your thoughts on the uses of technology?*

**ORI:** Computers are still not used to their potential. What I do is create 3-D surrealistic worlds and then animate them into movies and take video footage and sounds and put them together and create little movies on a computer, then you can put it onto VHS. I've done poetry, history, social stuff, I mean a whole bunch of stuff. Once I tapped into that I was able to find other interesting things like the Internet.

**BEN:** I learned about programming and I wrote programs. One was a graphing program for math usage. I kind of applied what I knew in other areas to write programs that could do things like that.

**ORI:** But the computer is not erasing the teacher. In what we're doing the computer is the teacher. It's someone who has unlimited patience, will never get mad at you, has no biases, will also go at your rate, doesn't have to worry about 35 other students, just won't care about all those things that humans have faults in. I mean, teachers are wonderful and teachers are great, but teachers can only handle so many people. I mean, some teachers teach best when they're teaching one on one.

**IZZY:** It's important to learn from a teacher who has experiences that can be shared.

**DAVI:** There isn't any computer that can replace the teacher.

**WES:** A good teacher. That's the key.

**ORI:** But a good teacher's hard to come by.

**WES:** A computer's easy to come by.

**SUSANNA:** I'm really for teachers; I'm really for people making things look attractive to you so that you're interested in them and then making things more understandable to you because by yourself you can't understand everything or discover everything. All of the exhibits, there's always something more to it and what's going on is you're a teacher for that exhibit.

*What do you like about having access to online information?*

**ORI:** On the Internet, everyone's computer is offering a different thing. You can have two people on the planet who are interested in one subject, and you already have a discussion group. If you're interested in something, there is somebody out there that actually is interested in what you are. The most amazing thing is how far it reaches. You have access to things that they simply don't have in a library.

**WES:** It's easy to get information for papers. I've done about four papers, mostly science and history. One about pioneers and one about the planets, and it was really easy to get information, highlight it, print it out, and copy it.

**SUSANNA:** So this is very useful and very amazing that you can find everything, anything...but it also kind of scares me to be faced with so much data.

**IZZY:** Well, that's nice and all, but then again, not everybody has access...because maybe they can't afford to have them because they don't make any money. And once you have lack of information, it's hard to develop as technology becomes more involved.

**ORI:** But the whole point of the computer is now just almost at a level where all the people can actually reach in and learn.

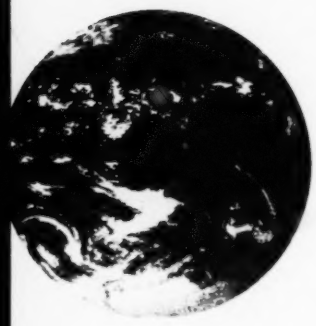
**THE EXPLAINERS:**

**DAVI ALMEIDA**
**WASHINGTON HIGH SCHOOL**
**SAN FRANCISCO, CA**

**WEB BOX**
**SIR FRANCIS DRAKE HIGH SCHOOL**
**SAN RAFAEL, CA**

# INFLUENCE OF ACCESS TO ONLINE INFORMATION

## AN ONLINE CONVERSATION WITH KEN DOWLIN & JACKIE HESS



*What are the goals of your respective organizations?*

**KEN DOWLIN, CITY LIBRARIAN**
**SAN FRANCISCO PUBLIC LIBRARY** (SFPL)
It is the intent of the SFPL to become *the* community communications center for San Francisco. The New Main Library and its services will include a Children's Discovery Center, Deaf & Hearing Impaired Services, an Ethnic Heritage Collection, a Business & Technology Center, Job & Career Information and a Gay & Lesbian History Center, to name a few. Additionally, conference and meeting rooms with cutting-edge technology will be open to the public, demonstrating the New Main's ability to serve a variety of purposes.

SFPL has an online public access catalog of over 80% of the books in the collection. We are currently assessing a prototype catalog that provides a gateway to other networks, online images, and eventually multimedia content. The library has been experimenting with image creation, storage and retrieval through the use of imaging work stations for over a year. There are plans to create online Community Resource Files that will push the library's access and navigation program into the information and knowledge institutions and agencies in the community.

Libraries can play a pivotal role in a community. As the San Francisco Connection, a networking program to connect home, school, and office to the library and the NII (National Information Infrastructure) become more visible, I anticipate that the community will understand the potential of the public library to serve as not only a storehouse of information but a gateway to information and knowledge throughout the world. The New Main library will metamorphose into a *neographic* institution. That is, it will use all mainstream technologies to ensure publicly subsidized access to information, knowledge, individual learning, and the joys of reading to our diverse community.

**JACKIE HESS, DIRECTOR**
**NATIONAL DEMONSTRATION LABORATORY**
**(NDL), WASHINGTON, D.C.:**
At the NDL, we teach people about multimedia and related optical technologies used in education, training, and the workplace. The NDL has existed for six years, four at the Smithsonian Institution, the past two at the Library of Congress. We attempt to counter "technophobia" by talking to people about the issues associated with technology. We offer evaluative criteria; we demonstrate a variety of pedagogical approaches and talk about the appropriate use of each; we allow people to "reality test" the position of their institutions in the overall field. The NDL serves as a beta test site for a number of programs and participates in many collaborative projects. We work with multimedia producers to help make their products more useful to educators. Since moving to the Library of Congress, we have tried to help that institution move into the information age.

The Library's American Memory Project has been one attempt to make collections, exhibits, and logistical materials available to the nation electronically. Last year, the NDL digitized the Library's exhibit *Revelations from the Soviet Archives*, and portions were placed on the Internet and on America Online. Later, we digitized portions of the Vatican collection. In both cases, tens of thousands of people who would not have otherwise seen the documents were able to have access to them. And yet in both cases, we faced unresolved issues of intellectual property rights.

Even more recently the Library has established a broader presence on the Internet and America Online. Based on early utilization data, there appears to be a great demand for such access. Ultimately, people should be able to access files, books, images, and sound and video recordings from the Library, as well as file for copyrights, apply for jobs, and have real-time conversation with experts. Between here and there lie some major impediments: the resolution of the Library's ability to recover associated costs and the need to raise millions of dollars to cover the cost of digitization.

*What are the implications of online connections to the world?*

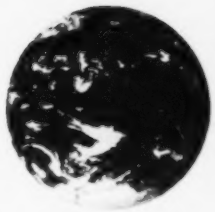
**KEN**: I think that the greatest value of the networked education institution could be the ability of the network to allow, and encourage, ad-hoc collaborations without the constraints due to time differences and geography. Classes all over the world could be linked for specific learning experiences. Cross-cultural exchange would be facilitated to increase the knowledge of students. There is an immediacy about the information on current events that can only be displayed via the computer network.

**JACKIE**: Access implies the end of intellectual isolation based on geographic isolation. It will increase anonymity of online communications, which may result in increased personal irresponsibility. It will also increase the need to develop powers of intellectual discrimination in an effort not to drown in the sea of digital data.

*How does one manage the quantity of information that is available, and how will this influence teaching and learning?*

**KEN**: I doubt that anyone actually manages the quantity of information as well as they would like. There is a difference between the "scientific method" of decision-making and the "critical method." The scientific method is based on building models or experiments that can be replicated. In the critical method, one only needs enough information to make a correct decision and part of the skill is to know when enough is enough. I do feel that what will happen is education will be focused on navigation, developing access, and developing critical skills rather than content. Education needs to shift from the "banking" concept – filling kids' heads up with facts – and move to the "connecting" concept – that is training the kids to find appropriate, accurate, and timely information when they need it.

**JACKIE**: One creates a market of value-added "spigots" to keep from drowning in the firehose of information. This may have the same impact on education as cable television has had on the broadcast industry, with the same strengths and potential dangers. Information will be packaged for very narrow markets; the potential for enormous bias is disconcerting. Just as broadcast television has been a nationally unifying force and cable threatens to resegment the population, education has been an even greater force for the development of a national ethos. I would hate to see educators use access to source data to justify and create very narrow ethnocentric curricula. On the other hand, access to previously unavailable material can give real meaning to our verbal commitment to multiculturalism.



*What is the importance of access to source documents for students?*

**KEN**: I think the end result of a broadly based program to provide source documents is empowering the students to make up their own minds. The information will become less filtered, interpreted, and perhaps biased.

**JACKIE**: Source documents bring authenticity to the study of a subject. They encourage understanding that history does not speak with one voice. This brings a depth, an intellectual rightness, to the understanding of an issue that simply cannot be conveyed in the limited scope of a textbook. Reading contemporaneous journals, watching contemporaneous newsreels, seeing the marginalia in the draft of a famous document-- all of these things give students a visceral sense of events that a textbook cannot; they offer an understanding of nuance that is not conveyed otherwise.

*How will access to information change in the next five years?*

**KEN:** I see an explosion of individual access to networking, primarily via the Internet, but I also see that institutions and agencies may lag behind. The globe will continue to shrink, and there will be many new communities formed electronically that relate to people's self-interest.

**JACKIE**: Until the economics of digitization and data transmission and the installed base of fiberoptic networks evolve, I predict access to the "easy stuff" – to lots of text and still images that do not have intellectual property rights problems. For libraries, that might mean materials that they generate themselves and old books whose rights are in the public domain. Widespread access to other material – video and sound recordings, recent materials, periodicals – will come more slowly.





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*How has the role of the librarian or information specialist changed? How will your centers accommodate schools without librarians or libraries?*

KEN: Actually, the role of the librarian has only changed by a small degree over the last decade. I would like to see it change dramatically and believe that it must do so to remain a viable profession. The librarian must move from the mode of pointer and retriever to that of the manager. The manager is responsible for collections, technology, programs, fundraising, and a host of functions that didn't exist online before. The SFPL is attempting to work with the schools without libraries and librarians. All librarians must become engaged now. Unfortunately, the net result is that the public library becomes more of a school library without the resources to do them well. Thus neither agency can flourish.

JACKIE: Certainly the roles of educators, both formally and informally, will evolve. They will no longer be expected to keep all existing information about a subject in their heads. They will need to become masters at learning to ask the right questions and teaching others to do so. They will need to be able to evaluate a far greater amount of information with respect to source credibility, bias, utility, etc. They will be as critical as ever, but in a different way. Good educators, teachers, and librarians have never felt threatened when confronted with a question they couldn't answer. Many, however, did, and stifled independent inquiry. I cannot imagine schools without libraries and librarians. Surely the art of browsing stacks and holding a book in one's hand should not be lost. Should we get to the point, however, where learning takes place primarily outside a school setting, major centers of information — such as the Library of Congress — would have to be staffed heavily with available online experts and "knowledge navigators."

NATIONWIDE, 53% OF APPROXIMATELY 85,000 PUBLIC SCHOOLS USE BOTH NETWORKS AND MODEMS, ALLOWING THEM TO ACCESS OUTSIDE RESOURCES.

*How will libraries and online information services be financed?*

KEN: The current support is a mish-mash now with little coordination in the programs in San Francisco. I know that other parts of the country are doing much better. Libraries will never be free, they are only pre-paid by the taxpayers or corporations. The mission of the public library is to provide subsidized access. I feel that the library has a historic compact to provide the services that the public feels they have paid for through their taxes. I also feel that services that increase convenience or provide added value above the traditional level may be fee based. Someday the community may understand the need for tax-supported document delivery, cable television, etc., but not now. Part of my job is to get the maximum subsidy possible, but part of my job is to seek additional funding to increase access whenever possible.

JACKIE: Not many organizations are financially supporting the development of online material for K-12 education. Those who have a stake in the long-term development of that market — primarily online service providers — have made some investment. The White House has just established a working group, on which I serve, to look at the future of online distribution to educators of materials held by national agencies, including the Smithsonian, the Library of Congress, the National Archives, and the individual government departments.

Libraries have evolved greatly over time. The current concept of a free library serving as a democratizing force is reasonably recent. The real question is: will there be a vast body of knowledge, whether housed in a brick building or available to you in your home, that will still be free and accessible to all? If the answer is not yes, we risk letting technology sabotage democracy in a way we fought so heavily against allowing the Soviets to do.

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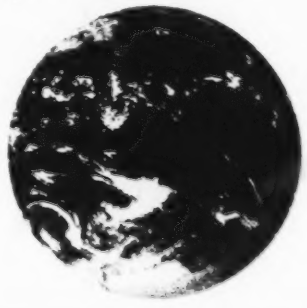
*What sort of preparation and support will educators, students, parents, and community members need to use such systems?*

KEN: Teachers, students, parents, etc. will need support to optimize the benefits of the electronically networked information world. While there are many actors that support this, schools, telecom providers, government agencies, and so on, I contend that the community must have a Community Electronic Information Infrastructure, and I propose that the SFPL is ready and willing to create one of the first in the country.

JACKIE: Educators need help in understanding how to integrate the wealth of new information into existing curricula. Unfortunately, schools, administrators, teachers, and students are still judged almost entirely by standards based on curricular achievements. The onus should not be on individual teachers to incorporate new technologies into traditional ways of teaching. Schools, libraries, and other community facilities need to hire technical support people to handle the care and feeding of the equipment. Educators should be allowed to focus on design and implementation issues. I constantly tell our visitors not to put their common sense on hold just because something is technology based. As this field matures, evaluative criteria and peer review protocols will develop.



# Access to Information

**The Alliance for Public Technology (APT)** is a nonprofit membership organization concerned with fostering equitable access to affordable and useful information and communications services and technologies.
Contact: Barbara O'Connor, 916-278-6415; boc@csus.edu

**The Education and Technology Resources Center (ETRC)**, sponsored by the Association for Supervision and Curriculum Development (ASCD), gathers, synthesizes, and disseminates information resources for educators to promote excellence in teaching and learning. Projects include two online bulletin board services, publishing a curriculum and technology newsletter, and developing multimedia products.
Contact: Jeff Rupp, 703-549-9110; ascdetrc@capcon.net

**The Benton Foundation**'s Communications Project, a collaborative program with the John D. and Catherine T. MacArthur Foundation, seeks to strengthen public-interest advocacy in communications policy. It focuses on constituency building among nonprofits, policy development, and the promotion of model applications that deliver social benefits, particularly in education and health care.
Contact: Andrew Blau, 202-638-5770 x31; ablau@cap.gwu.edu

**The Center for Children and Technology (CCT)** undertakes policy studies, research, and prototype development to improve the circumstances in which teachers teach and students learn. In 1988, CCT established the national Center for Technology in Education (CTE). CTE's mission is the study, design, and demonstration of the roles technology plays in improving student learning and achievement.
Contact: Julie Thompson, 212-875-4560; jthompson@edc.org

**The Center for Interactive Educational Technology (CIET)** conducts research and development and evaluation projects focusing on the design and evolution of learning-related technologies. It is sponsored by the George Mason University's Graduate School of Education.
Contact: Chris Dede, 703-993-2019; cdede@gmu.edu

**The Coalition for Networked Information (CNI)** promotes the creation and use of networked information resources and services that advance scholarship and intellectual productivity. The Coalition is sponsored by the Association of Research Libraries (ARL), CAUSE, and EDUCOM.
Contact: Joan Lippincott, 202-296-5098; joan@cni.org

**The Computer Learning Foundation (CLF)** is a nonprofit organization dedicated to the improvement of education and preparation of youth for the workplace through the uses of technology. CLF serves as a clearinghouse of information on using technology effectively, offering numerous resource guides for parents and educators, hosting Computer Learning Month, and providing funding to schools.
Contact: Sally Alden, 415-327-3347; fax: 415-327-3349

**The Consortium for School Networking (CoSN)** represents educational, institutional, and commercial organizations interested in all aspects of electronic computer networking. It was formed to further the development and use of computer network technology in K-12 education.
Contact: Connie Stout, 202-466-6296; cosn@bitnic.bitnet

**The Electronic Frontier Foundation (EFF)** is a membership organization that brings together legal, technical, and policy expertise to address the democratic potential and social impact of new computer and communications technologies. EFF seeks to promote the broad social and economic benefits offered by new technology while safeguarding principles of freedom, openness, competitiveness, and the civil liberties of individual citizens.
Contact: Jerry Berman, 202-347-5400; jberman@eff.org

**The Foundation for Technology Access (FTA)** is a growing national network of community-based computer resource centers and technology vendors redefining human potential through the uses of technology. Member centers, called the Alliance for Technology Access (ATA) are committed to using technology to enable children and adults with disabilities to control and direct their own lives.
Contact: Bridgett Perry, 510-528-0747; jpbrand@cis.calstate.edu

**The Institute for Learning Technologies (ILT)**, at Teachers College, Columbia University, works to advance the role of computers and other information technologies in education and society. ILT seeks to achieve systemic change through multimedia and network technologies used to create sophisticated learning environments and through public-policy initiatives that mobilize broad coalitions of interested parties to transform education.
Contact: Robert McClintock, 212-678-3375; robbie@ilt.columbia.edu

**The Institute for Research on Learning (IRL)** conducts research on learning and change strategies in schools and workplaces. Technology tools are developed to support new teaching and learning practices for middle schools.
Contact: Peter Henschel, 415-496-7930; peter_henschel@irl.com

*continued on page 12*

Resources

**The Institute for the Transfer of Technology to Education (ITTE)** promotes the uses of technology in education and is supported by The National School Boards Association. ITTE sponsors national conferences, publishes a newsletter, and supports the Technology Leadership Network (TLN), a consortium of school districts nationally using technology.
Contact: Cheryl S. Williams, 703-838-6213; fax 703-683-7590

**The Institute on Education and Training (IET)**, established by Rand Corp., conducts policy analysis to help improve education and training for all Americans. IET's work explores how education must be systemically restructured to exploit breakthrough technologies. To ensure that its research affects policy and practice, IET conducts outreach activities and disseminates findings to policymakers, educators, researchers, and the public.
Contact: Georges Vernez, 310-393-0411 x7691; vernez@rand.org

**The Internet Society** is a personal membership, professional, and scientific organization encouraging exploration of new Internet applications in academic, scientific, governmental, and industrial settings, and through its research and administrative activities supports the technical evolution of the protocols used on the Internet.
Contact: Howard Funk, 703-648-9888; isoc@isoc.org

**The Learning Technology Center (LTC)** investigates the uses of multimedia technologies in laboratory and field-based settings. LTC creates interactive learning environments that enhance K-12 classroom teaching, learning, and assessment. The LTC is housed within Peabody College at Vanderbilt University.
Contact: Pio Poe, 615-322-8070; poeft@ctrvax.vanderbilt.edu

**The National Foundation for the Improvement of Education (NFIE)** supports experimentation with advanced technologies as a tool in restructuring the environment in which students learn. NFIE also informs the education and business communities, policymakers, and the public about what it has learned. NFIE is a nonprofit foundation established by the National Education Association.
Contact: Judy Hodgson, 202-822-7840; nfiel@aol.com

**TERC** is a nonprofit education research and development organization created to improve mathematics and science teaching and learning through the integration of telecommunications and other multimedia technologies. TERC is an innovator in the development of technology rich curricula.
Contact: Alan Feldman, 617-547-9430; alan_feldman@terc.edu

**The United States Education and Information through Telecommunications (USE IT)** project is a cooperative agreement between the Council of Chief State School Officers and the U.S. Department of Commerce to conduct needs assessments and develop recommendations on how technology can help meet the National Education Goals.
Contact: Frank B. Withrow, 202-336-7003; fwithrow@aol.com

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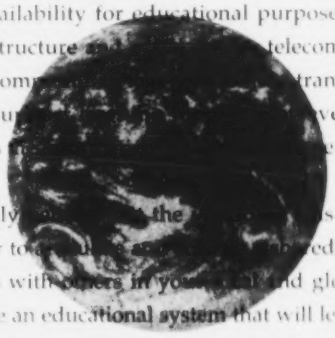
# EDUTOPIA

THE NEWSLETTER OF THE GEORGE LUCAS FOUNDATION

## LETTER FROM THE CHAIRMAN

we continue to talk with many of you about the work of transforming education, it becomes increasingly clear that collaborations are essential if this country is going to have meets the needs of lifelong learners. Collaborations attention and energies to achieve a shared vision. working together online to solve coordinating these services for children elected of need to work

We find ourselves in the midst of mation and communication in which information and resources abound, yet the joint efforts that are necessary to provide access for all remain unsettled. The relationships made possible by telecommunication connections have great potential to challenge all learners. They have the ability to engage students, teachers, parents, experts, community leaders and others in solving common problems. Telecommunications can facilitate learning in all kinds of environments, giving learners the opportunity to express themselves and their ideas in a variety of ways. Recently, I have become involved in the national policy debate over the power of telecommunications to enhance education and the most effective ways to ensure its availability for educational purposes. With the appropriate infrastructure telecommunication technologies knit com transform them into systems that su ver, without the ability to access is useless.



I firmly the s country depends on our ability to ed vision. I urge you to join forces with others in your and global communities to help realize an educational system that will lead us into the twenty-first century.

GEORGE LUCAS

## STUDENTS' VIEWS ON LEARNING ONLINE
## INTERVIEW

nt online for a real-time conversation with at West Valley High School in Cottonwood, town north of San Francisco, about their col- work using Global Lab.

*is Global Lab?*

**Michele**: Global Lab is a network designed to combine scientific knowledge for solutions to problems.

*What was your first impression when you got online with Global Lab?*

**Michele**: My first impression was that I thought it was a great opportunity to become more aware of advances in education and communication, and how they can be combined to increase learning.

**Rebecca**: The first time I used Global Lab I was amazed to see how many other people were involved and interested in the different subjects concerning our environment, such as pollution in the air and water.

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THE GEORGE LUCAS EDUCATIONAL FOUNDATION

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# *EDUTOPIA* UPDATE

COLLABORATION: The word is not new, but the concept has taken on increased importance as partners struggle to achieve shared goals. Just as we know that the entire educational system must be transformed to meet the needs of a community of learners, we know this transformation requires an interdependency among people and ideas from different backgrounds as never before. By helping identify examples of dynamic alliances, we hope to act as a vehicle for envisioning and facilitating collaborations that will lead to change.

Our videos will be a product of collaborations among educators, technology experts, parents, community members, students, architects, business people, producers, directors, writers, actors, editors and a host of others working to develop dramatic images of an effective educational system. And in our effort to produce a resource document that will identify exemplary schools, programs, resources, policies and research, the sheer volume of data makes it imperative for us to work closely with others.

This second issue of *Edutopia* focuses on various types of collaborations for learning. Students exploring environmental science issues through a global telecommunications project share their enthusiasm and ideas via a real-time online interview. A psychologist-turned-principal tells us how he, with sustained support from his community, transformed a rural school with myriad problems into a new model for learning. In an online exchange, the founders and partners of a charter school in the Midwest discuss how to tackle the dropout problem. And prominent school reformers summarize research findings from a school change model that is built on collaborations, from small intervention teams working together helping individual students to community-wide partnerships working to improve the whole school.

We are pleased that the first issue of *Edutopia* met with an overwhelmingly positive response. You contacted us by phone, fax, letter, and with more than a thousand electronic messages. Many of you commented on the **Access to Information** column and, in the spirit of collaboration, forwarded suggestions to include additional organizations for future publications. We encourage your feedback and depend upon you to keep us informed so that we may continue to help connect people and ideas.

*Edutopia Staff*

# COMMUNITY INVOLVEMENT

by Dennis Littky

When I took over the principalship of Thayer High School in Winchester, NH, 13 years ago, the community's image of the school was very poor. All I heard was how bad the school was. I knew that the public perception of the school needed to change. Thus, my first task was to begin to listen to the community, to understand their concerns and dreams for their children — and to share with them the staff's vision for Thayer. Each week I'd have a "coffee" at someone's house with a school board member, to eat, drink coffee and talk on the community's turf — not at the school. Before each meeting was over, I had every community member in attendance commit to doing one thing in the school. These things turned out to be tutoring students, teaching a specialized skill, driving students to field trips, typing, etc. Then we followed through and made sure every person actually helped the school. These coffees continued throughout the years. They not only took place in homes, but at lunch time at parents' places of work, at breakfast in local diners, and at meetings with church and Kiwanis groups. These meetings developed trust between the school and the community.

Within the school, I found the need to change teachers' and students' attitudes about the community as well. From the start, I heard the students and teachers talk about how parents didn't care. I saw that the only communication from our school to parents was negative; schools tend to call and write home when students are not doing their work or need to be suspended. To open up positive communications, we established parent conference days, where we had the opportunity to talk about the students.

Before our very first parent conference, the word around the school was that no parent would show up. So we wrote letters to local businesses asking them to release their workers to attend our conferences. Their supportive response was fantastic. Also, perhaps most important, we said parents must attend the conference in order to receive their child's report card. The result: 96 percent of the parents showed up. Since then, 95 percent of our parents have continued to show up twice a year for 13 years, now with very little effort on our part to get them here.

The success of that first parent conference was a turning point for the school. Afterwards, the teachers had a very different feeling about the parents, and the community began to feel that the school cared. The trust was building. To ensure continuity, advisors stayed with their students for four years. The parents now knew that they (and their children) had an advocate in the school and would meet with this advisor twice every year during their child's high school career. Our parents' relationships with their kids also began to change. Now that there was a structure in place to involve parents in their children's school lives, many became more personally connected to their children. But the coffees and parent conferences only set the stage. Simply showing and explaining the school to the community is not enough; the community must be truly involved. And by this, I mean more than bake sales and booster clubs. From the start, I knew we needed input from parents and other community members to do what was best for our kids. The information we got from the parents at the coffees helped us better understand the needs of our students and develop our school appropriately. At these events, many parents spoke of their children feeling disconnected and uninterested in school; hence, our main efforts were to design programs that engaged students and to create a personalized atmosphere. Our breakfast meetings with local business people resulted in a list of skills they felt were critical to success at work; these figured heavily into the selection of 19 graduation skills that focus our curriculum. This group also joined with us to establish a policy for issuing work permits based on academic progress.

*continued on page 6*



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The School Development Program (SDP) model was established in 1968 as a collaborative effort of the Yale University Child Study Center and the New Haven public schools. It began in two elementary schools that were the lowest achieving in the city, had poor attendance and serious problems with relationships among students, staff and parents. Staff morale was low. Parents were angry and distrustful of the schools. Hopelessness and despair were pervasive.

Our Yale Child Study Center staff — social worker, psychologist, special education teacher and child psychiatrist — identified underlying problems in these schools: family stress and student underdevelopment in areas necessary for overall success, as well as organizational, management and child development knowledge and skill needs on the part of school staff. Schools were ill-prepared to modify behavior or close the developmental gaps of their students. The staffs usually responded with punishment and low expectations. Such responses led to difficult staff-student interactions and, in turn, to difficult staff-parent and community interactions, staff frustration and a lower level of performance by all.

A number of realities about the American educational system became apparent to us. The organization and management of the vast majority of American schools are deeply entrenched in the attitudes, values and ways of the larger society, and maintained by traditional training and practice. Efforts toward improvement such as providing knowledge of research findings, in-service education, and mandates from the outside rarely bring about significant or sustained change.

**...CHANGE, MECHANISMS MUST BE CREATED ... STAFF TO ENGAGE IN A PROCESS IN ... KNOWLEDGE OF SYSTEMS, OF CHILD ... BEHAVIOR TO EVERY ASPECT ... PROGRAM...**

In order to promote change, mechanisms must be created that allow parents and staff to engage in a process in which they gain and apply knowledge of systems, of child development and of individual behavior to every aspect of a school program in a way and at a rate that are understandable and not threatening. When faithfully adhered to from the start, these mechanisms help the people involved achieve the kinds of small early successes crucial to reinforcing confidence in the new program. Each success encourages the staff to use these ways of working, until the new ways eventually replace the old.

Working collaboratively with parents and staff in New Haven, we gradually developed a nine-component process model (3 mechanisms, 3 operations, 3 guiding principles). The mechanisms are (1) a governance and management team representative of the parents, teachers, administrators and support staff; (2) a mental health or support staff team; and (3) a parents' program. The governance and management team carries out three critical operations: the development of (4) a Comprehensive School Plan with specific goals in the social climate and academic areas; (5) staff development activities based on building-level goals in these areas; and (6) periodic assessment, which allows the staff to modify the program to meet identified needs and opportunities.

The model also includes several important guiding principles and agreements. Participants of the governance team (7) cannot paralyze the leader. On the other hand, the leader cannot use the group as a "rubber stamp." While the principal usually provides leadership to the governance and management group, (8) decisions are made by consensus to avoid "winner-loser" feelings and behavior. (9) A "no fault" problem-solving approach is used by all of the working groups within the school, and eventually these attitudes permeate the thinking of most individuals.

In 1990, SDP began developing partnerships with schools of education, state departments of education and other institutions. These partners will eventually be able to support the efforts of local and neighboring school districts independent of the Yale Child Study Center. It is planned that these alliances will evolve into semi-autonomous regional centers in different parts of the country.

Additionally, the work has been extended through high schools and is beginning to address curriculum, instruction, assessment and technology issues through involvement in a New American Schools Development Corporation-sponsored project entitled Authentic Teaching, Learning and Assessment (ATLAS) Communities. This cooperative effort will fuse the principles and practices involved in Ted Sizer's

Coalition of Essential Schools at Brown University, Howard Gardner's Project Zero at Harvard University and Janet Whitla's teacher preparation and technology utilization work at the Education Development Center in Newton, MA.

Technology is a great asset in linking schools, homes and communities for learning, engagement and support. After parents and children receive training in the use of computer technology, they can communicate with schools and one another during and after regular school hours. This communication helps bridge the gap among schools, homes and communities. It strengthens the collective capacity of the entire network of services to respond more efficiently and effectively to meet the needs of children and their families.

The SDP model calls for all groups to work together, coordinating resources and programs to establish and achieve school objectives and goals. This work is driven by relationship and child development imperatives, focusing most on institutional arrangements that hinder adequate functioning of all members of the school community. The goal is to create a school climate that permits parents and staff to support the overall development of students in a way that makes academic achievement and desirable social behavior possible. Such an approach has a much greater potential for improving students' academic success, decreasing the likelihood of their being involved in problem behaviors and increasing their chances for life success.

In an analysis of achievement data in the Benton Harbor, MI area schools, SDP schools demonstrated gains that significantly exceeded those reported for the school district as a whole. An assessment of SDP effects conducted by the research office of the Prince George's County, MD public schools revealed that average percentile gains on the California Achievement Test were significantly greater for SDP schools than for the entire district.

Measures of attendance, suspensions, classroom behavior, group participation and attitude toward authority were used to assess students' school adjustment. Data analysis indicated that over a four-year period, schools experienced significantly greater declines in suspension days, absent days and number of corporal punishments recorded when compared to the district as a whole.

In a recent study, SDP students in the fourth and sixth grades were compared with non-SDP students on six self-concept dimensions on the Piers Harris Self-Concept Scale. Analysis revealed notably higher scores by the SDP students on all six self-concept dimensions and on total self-concept. Other studies by Haynes, Comer and Hamilton-Lee also indicated important positive changes in self-concept when compared to non-SDP students.

**THE GOAL IS TO CREATE**
**PARENTS AND STAFF TO**
**MENT OF STUDENTS IN A**
**ACHIEVEMENT AND DESIRABLE**
**ACCEPTABLE LEVEL BOTH**

In a quasi-experimental study involving 288 students, those in SDP schools reported significantly more positive assessments of their classroom climate than did students in non-SDP schools. Classroom climate was assessed using the Classroom Environment Scale. A total of 155 parents and 147 teachers also completed a school climate questionnaire designed by the researchers. Parents and teachers of students in SDP schools reported greatly improved assessments of their schools' climate when compared to parents and teachers of children in non-SDP schools.

In summary, the School Development Program is not just another new program to be carried out along with the other experiments and activities already underway in a school. It is a nine-element process model that takes substantial time, commitment and energy to implement. It is a different way of conceptualizing and working in schools and completely replaces traditional organization and management. Most important, the School Development Program produces desirable outcomes only after a cooperative and collaborative spirit exists throughout a school.

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RESEARCH

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## Community Involvement

*continued from page 3*

It is also important for our students to be involved in the community. As soon as I began as principal, we started working on ways to involve students with the community on a daily basis. Our primary motivation was that we knew we needed resources beyond the school building. Thus were born our apprentice and community service programs. Each year now, 25 percent of our students work in the community at banks, insurance agencies, the lumber yard, the nursing home, the elementary school and more. The adult workers become the students' teachers, grading their work and meeting with our coordinators at Thayer. Through these programs, the community becomes more committed to the education of our children, and our children become more committed to their community.

When the community trusts the school, it will be willing to listen, support, forgive and understand. If there is a crisis, the community's reactions will depend on the relationship that the school and community have built in the past. Building this kind of trust is a long, continuous process, not one fancy meeting. We at Thayer have made mistakes along the way, and even now, we are far from where we want to be. We will continue to work, because we understand that the education of our children depends on the involvement of the community.

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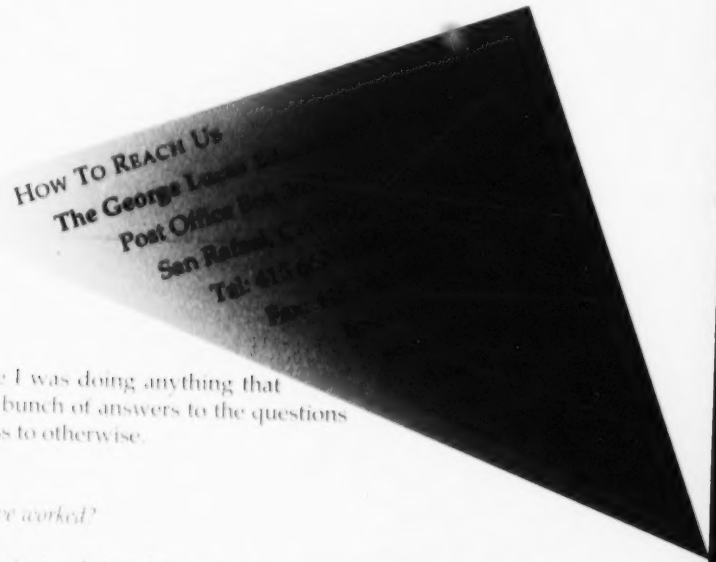


## Interview: Learning Online

*continued from page 1*

**Amy**: When I went online, it didn't feel like I was doing anything that would benefit my experiment. Then I got a bunch of answers to the questions we had posed that I wouldn't have had access to otherwise.

*Has there been a favorite project on which you have worked?*

**Rebecca**: We worked on a soil sampling project, while other people worked on ozone pollution at ground level. One group worked on water pollution. Right now I am looking into a pollution sampling from a gravel plant that is destroying Clear Creek. I've also observed the severe erosion effects that a local company has caused by putting in roads and trenches.

**Shasta**: Right now we're working with the effect of ultraviolet (UV) radiation on yeast cells. It will help to show the lethal effects of UV on the cells as well as the depletion of the ozone layer. Yeast cells repair DNA in much the same way as human skin cells do. They will be a model system to do experiments judging the effect of solar UV on all cells because the DNA in all cells is what is damaged.

**Amy**: The experiment I enjoyed most was the effect of violent audio-visual stimulation on the heart rate. I enjoyed doing that one because we worked with people, and we used Data Logger 3.04 and a heart rate monitor. Our results were interesting, and our hypothesis — that the heart rate would increase when subject viewed audio-visual violence — was correct.

**Michele**: We learned to make a gel used to create DNA fingerprints, which is extremely useful in the genetic research field. We are working on a project in which we will spool DNA from the thymus and tripe of a cow, green onion and spinach. We will refine the DNA ourselves so that it will be capable of being run through the electrophoresis chamber and stratified into defined banding for analysis.

**Lance**: Mike and I, in a cooperative effort, went online concerning the study of plant pigments in relation to electrophoresis and chromatography.

**Mike:** We worked with two other people here at West Valley and found that the experiments had never been documented, so we documented our experiments that included information gathered from our global contacts.

*What other kinds of relationships have you established while working online?*

**Shasta**: Right now I am communicating with Brad Williamson, a teacher on loan to the Department of Physics and Biology at Kansas State University in regards to my yeast, UV experiment for some definition of the guidelines I'm following in a handbook he helped write.

**Michele**: Using this online network, we are finding professionals to give their opinion on our gel content project.

**Lance**: With the use of this technology, we are able to communicate with fellow scientists and students, and share information. It is something that has greatly improved the quality of our experiments.

**Rebecca**: We have been in communication with several other schools doing soil sampling. One school on the East Coast and one in Coff's Harbor, Australia. A teacher, Bill McWeenay, from Central Middle School in Quincy, MA, started a global journal called *The Planet*. (Our school came up with the name.) All articles in *The Planet* are by Global Lab students. They range from student research to poetry to book reviews, to student art work. We were also communicating with Vainona High School in Zimbabwe to get information about different ecosystems.

**Mike**: This modern technology enables us to get information and talk to people we would not normally be able to gain access to. It is a great help in our experiments and is something that we can learn from.

*What else did you learn from your online experiences?*

**Rebecca:** Finding out different peoples' experiments and ideas on different topics.

**Michele**: How to correspond and communicate with a wide variety of intelligent people is the most interesting thing that I have learned while working online.

**Mike**: One of the things we learned is that sometimes it is easier to go online for information, although you might not always find something online to help you, but hey, it's worth a shot anyway.

*What does this technology allow you to do that you couldn't do without it?*

**Amy**: This technology allows me to speak with people all over the world. It also allows me to get help with various problems that come up in our experiments. Without it, I would have very few scientific contacts, living in Cottonwood as I do.

*Has using this changed how you are learning?*

**Michele**: It is a much faster method to receive information, and you talk to people with personal experience in the area you are studying — if people answer.

**Rebecca**: It allowed us more research sources and showed other peoples' views. I learned the views of people with more experience. It's been a great experience and should be used by all schools.

**Amy**: Yes. It's definitely had an effect on my learning because I am aware that someone else with an idea is always out there, and if they have a computer, chances are I can get in touch with them. It makes me feel like we are becoming more and more capable of discovering information and making things happen for ourselves in the computer world. I also enjoy communicating with people who are interested in and doing the same things I am. I have gained a lot of support for what we are doing. Using Global Lab and being online is something that everyone should have a chance to experience, especially students.

*Thanks to Scott Battaion, a science teacher at West Valley High School who has facilitated the use of online learning for more than 120 students over the past four years. His address on America Online (AOL) is SGBattaion.*

*This exchange was conducted on AOL in a private room of the People Connection department.*

*The students pictured on the cover are from West Valley High School in Cottonwood, CA and Vainona High School in Zimbabwe. Vainona's e-mail address is: vainona@zimbix.uzzie*

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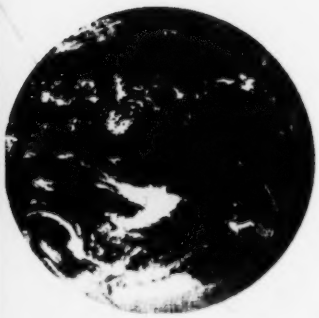
# COLLABORATIVE POWER

AN ONLINE CONVERSATION WITH MILO CUTTER, DAVE LARSEN & JANE SMITH



**Milo Cutter** *is a teacher of English and social studies at City Academy, St. Paul, MN.*

**Jane Smith** *is the community outreach and recruiting person in the Diversity and Staffing Department of Northern States Power Company, St. Paul, MN.*

**Dave Larsen** *is a district supervisor for the Recreation Center, Division of Parks and Recreation, St. Paul, MN.*

*What is City Academy and how was it conceived?*

City Academy is the outgrowth of a pilot program sponsored by the Mayor's Office and the Parks & Recreation Department of Saint Paul, and Northern States Power's (NSP) Office of the Chief Executive. The purpose of the program is to serve out-of-school, unemployed youth on the east side of St. Paul. That area of the city was chosen because of the high level of poverty and drop-out rate among youths 16-21 years of age.

The students at City Academy are required to be unenrolled prior to registration with the program. The program is comprised of a population in which 90% are below the poverty level, and 85% are representative of St. Paul's cultural demographics as follows: Native American, Hispanic, African American and Asian American. The law requires that the students be chosen by lot. There is currently a waiting list and a part-time afternoon program.

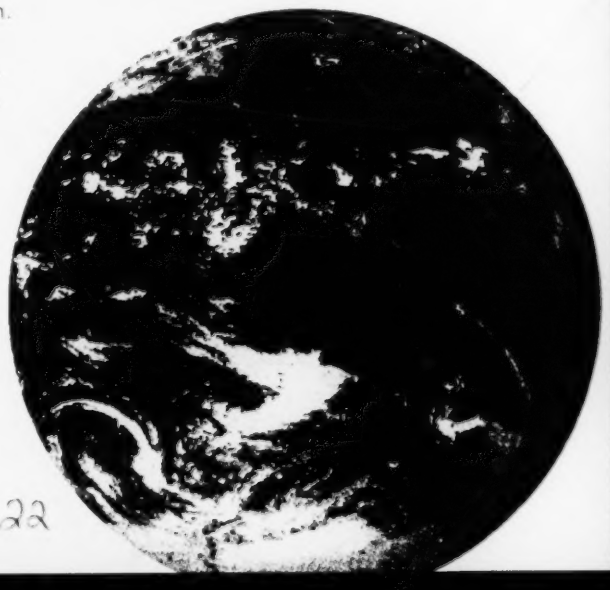
Initially, NSP and the City of St. Paul supported a pilot program developed by two teachers and a recreation aide. The program was designed to invite young adults to prepare themselves for re-entry into a diploma program by participating in "Power League." Power League included basic academic courses, health and fitness, community involvement and job readiness programs. Following the six-month pilot, Power League applied to become a charter school and was approved by the St. Paul public schools and the Minnesota Board of Education under the name "City Academy."

The curriculum of City Academy identifies outcomes for each student. These outcomes were originally based on standards developed by the State Department of Education as well as employers' (e.g. NSP's) standards, students' stated career goals (college, job, technical college), acceptance by post-secondary programs and students' self-evaluation of their needs for personal goal attainment.

*How did the collaboration begin?*

**Milo**: The original collaboration started with the previous mayor of St. Paul and his willingness to support an untried educational concept. All the pieces were present: proven need, corporate support, committed and experienced staff, available, affordable space. The initial project began in the summer 1991 with a program for St. Paul's east side. The results were presented to the mayor, who then arranged a meeting with NSP executives and the Power League to discuss future efforts.

Following the three-month pilot, the mayor invited the St. Paul School District superintendent to support charter school status for the Power League. An integral premise of the Power League was to continue to build connections and collaborations that would increase learning opportunities for the students in their neighborhoods.



NSP has been our corporate angel. Jane not only ensures finances for specific projects, but has committed a very valuable gift of time for job readiness and mentoring on a regular basis.

*Describe NSP's involvement.*

**Jane**: I've been involved for over two years, and Mike Hernandez, a plant superintendent, picked up a leadership role as the chair for City Academy. He grew up in the population served by City Academy and is personally interested in giving back to that community.

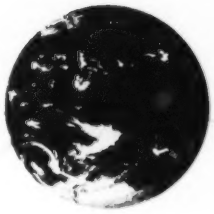
Our goal is to provide job opportunities. Last summer, we had student internships. I had an intern work with me in the Human Resources Department who walked out with some real world job experience.

We also do a lot of job shadowing. For example, last year, one student was shadowing an artist in the Graphics Arts Department. This really turned this student around. It gave her a focus on life that she previously did not have.

I also teach a work readiness program. Students have to attend one session per week, and when they've completed the course they receive a certificate. We go through everything from want ads to training manuals, to what to look for in employers, and what they look for in employees. We talk through expectations on both sides, how to write cover letters and create resumes. We also get into how to prepare, research and dress for an interview. Then we set up a real interview situation. I interview them, and then they interview one another, and ultimately use an interactive forum for feedback. They get first-hand experience and learn to give and receive constructive criticism. Ultimately, the class decides whether or not they would be hired for the job for which they are applying.

*How are the students responding?*

**Dave:** The attitude of these students is far superior to the attitude of those in a traditional high school. The students may have entered the program on the rough side, but they quickly learn the word "respect" and freely understand its use. Students are highly motivated and very involved in the program. The students conduct a pre-school program two mornings a week for young children in the community. Two students were hired as assistants for another recreation center in the community. Several students assist with the set-up for the senior citizen's program on Tuesdays.



**Milo:** The response has been very positive. Students enter most often with a very negative perspective on schools and people in authority positions. Within a few weeks, students become very protective of the process and their roles at City Academy. Students who have had histories of long-term truancy attend. Last year a young woman inquired about entering City Academy. She was living with an older sister and helping raise her two pre-school children. She was failing at the local district school, felt like a social and academic failure and was painfully shy when she first began coming to the program. She has since become very outgoing and much more confident. Two months ago, following an excellent presentation to the student body, she was elected school president.

Last week, she represented the school at a regional community needs planning session where she was the only youth representative among agency directors, community organizers and corporate executives.

Improved academic skills are the measurable results of the past two years. With the program now in place, students who did not picture themselves finishing high school are doing so now and attending post-secondary programs at technical or trade colleges and liberal arts or business colleges.

**Jane**: Eighty-eight percent of the academy's graduates are going on to post-secondary education.

*What are some of the most challenging issues you have encountered?*

**Jane**: One of the challenges is that some students aren't with us long enough for lasting impact. The hurdles include everything from prior juvenile court experiences to other challenges, like families moving, that are outside our control.

As part of a corporation, I wish we could do more. I would like to dedicate an entire staff to be involved in City Academy and other programs like it.

**Dave:** One of the biggest challenges is student and school acceptance by the community. One effort to relieve tension and show the project's diversity is a mural project in which individuals of different ethnic backgrounds work together creatively. The art classes have prepared the mural for a 100 foot wall that runs along the Recreation Center property.

Students come to the school from a variety of backgrounds, some with little hope for a future. Most set goals and keep their sights on them, and work hard to reinforce their newly found confidence. Some students go from gangs to a status where they no longer feel they need the support of a gang. They get their support in school.

The City Academy is located in a blue-collar community that is undergoing a cultural change. Initially, residents' comments about the school included feelings that these students had their chance and why should they pay for them to go to this school. The reality is that they now live in a diverse community, and the students at City Academy represent this diversity.

"STUDENT RESPONSIBILITY AND ACCOUNTABILITY PLACES THE BURDEN ON ALL TO IMPROVE COMMUNICATION AND PROVIDE EVIDENCE OF PROGRESS..."
–MILO CUTTER

**Milo**: The most challenging issue encountered to date has been fear expressed by a few, very vocal community members. The process of accepting change is slow. There has been much progress in our two years. The first year, the residents were sure the students were the cause of all the troubles on the east side. Later, they saw students and the program, not as a problem, but that it just should not be in their backyard. Now they say that maybe the problems are not related to City Academy. The students have made presentations to the East Side Neighborhood Development Council and garnered only praise, and met with the local crime watch group and received respect.

Another example would be the adjustments teachers have made. Students taking an active role in educational planning and creation of an educational environment creates a new role for the teachers involved. Classroom control is no longer an issue. Student responsibility and accountability places the burden on all to improve communication and provide evidence of progress. It's a major shift, and it does not happen magically, but slowly. After two years (which seems fast to me), it is happening and in a very solid fashion. We hardly ever hear "do I get credit if I do that?" but rather, comments such as "do you think I'm ready?" "I need more work in this area," "I think I understand -- let me show you."

*Is this program a model that can be duplicated around the country?*

**Dave:** Definitely, but it takes the right leadership and caring staff.

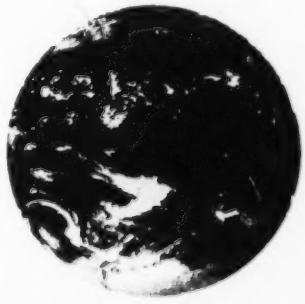
**Jane**: Heavens, yes. It takes corporate buy in, and it takes community buy in. If the community looks at these students as individuals who aren't worth caring about, it won't work. If you have support in one area, but not the other, it won't work. But many other corporations want to use NSP as a benchmark for their efforts. They have been calling to find out how to create their own collaborations. Other corporations want to be more involved and create positions where they can train community members for jobs in the future.

**Milo:** Yes, this program can be duplicated elsewhere, but the student involvement, the on-site management and the community support are essential. There are many ways this program could be duplicated. For instance, a direct litt: set up a system of sponsors and participants, which would ensure a cost-effective, student-centered, site-managed, education delivery program.

We need to recognize that we should provide students consistent opportunities to interact with their peers and adults, and develop an academic program that allows for small groups of 5 to 8 people for at least part of each day. Provide instruction and planning that increase student responsibility and accountability for the process at logical academic, social and personal levels. Provide communication and program links between the academic and post-academic worlds.

The program could be used effectively in whole or piecemeal. City Academy is not original. It is the integration of all the experiences of those who have been involved and, with wisdom and luck, will continue to recognize the wealth of information available through the on-going understanding of those experiences.

*City Academy is located within the Margaret Street Recreation Center, 1109 Margaret Street, St. Paul, MN 55106 612-298-4624; fax: 612-298-4172 oscarcsx@maroon.tc.umn.edu subject: City Academy.*



# Access to Information

**Asian American Communities for Education (AACE)** was created to encourage and assist all low-income children, ages 12 and older, to become the first generation of their family to receive post-secondary education. Major partners in this San Francisco program, a community-based organization, include The Mayor's Gang Prevention Program, Mission Language and Vocational School, Real Alternatives Program and Morrisania West.
Contact: Martin Mansma, 415-921-5537;
fax: 415-921-1841.

**Big Sky Telegraph (BST)** is a telecommunications network linking citizens and communities worldwide. BST offers free access and free online training to people of all ages, allowing access to distance learning opportunities, educational resources, community support services, economic development resources and global communications.
Contact: Frank Odasz, 406-683-7870;
franko@bigsky.dillon.mt.us.

**The Center for Collaborative Education (CCE)** is a program of the New York City public schools and the Coalition of Essentials Schools at Brown University, designed to enhance their visibility and assist others who want to build or redesign schools. Their goal is to create a network of public schools that teach children to use their minds critically and purposefully, and to inspire others to do the same.
Contact: Priscilla Ellington, 212-348-7821;
fax: 212-348-7850.

**The Center for Community Educational Excellence (C2E2)** works with community-based organizations and the public schools to build collaboratives, strengthen the quality of education for Hispanic students and more effectively involve Hispanic families in the education of their children. The Center is sponsored by the National Council of La Raza.
Contact: Lori S. Orum, 213-489-3428, ext. 612;
fax: 213-489-1167.

**The Center for Corporate and Education Initiatives (CCEI)** offers advanced strategies and management to help business/education partnerships develop a greater capacity to improve educational outcomes and implement a career-focused curricula.
Contact: Jamie Coats, 617-956-9151;
jamie_coats%hi_ccei%nemc@
nemces2.ban.nemc.org.

**Cross City Campaign for Urban School Reform** is a network of urban school reform leaders whose goal is to create accountable, educationally rich, small, equitable, autonomous and community-based schools for young people. They are working to redesign central office structures and to support school and community inter-connections.
Contact: Anne C. Hallett, 312-322-4880;
fax: 312-322-4885.

Resources

**Education for Tomorrow Alliance (ETA)** was created to enhance academic growth in the Houston area by forming partnerships between business, industry, educators and parents. Alliances include the Conroe Independent School District, the Houston Advanced Research Center and the South Montgomery County Woodlands Chamber of Commerce.
Contact: Elizabeth Masek, 713-364-6170;
fax: 713-364-6112.

**Los Angeles Educational Alliance for Restructuring Now (LEARN)** is a community-based organization dedicated to improving academic achievement for every student in the Los Angeles Unified School District. It is a coalition of over 630 civic leaders and representatives of Los Angeles' diverse education, ethnic, business, labor, academic, religious and social advocacy constituencies.
Contact: Mary Chambers, 213-255-3276;
fax: 213-626-5830.

**The Michigan Partnership for New Education** is a coalition of business, education and government dedicated to building an innovative educational system statewide. The partnership seeks to achieve higher levels of learning for all students by simultaneously transforming K-12 public schools and the universities that prepare teachers.
Contact: Judith Taack Lanier, 517-353-4996;
jlanier@msu.edu.

**The Mid-Atlantic Center for Community Education** at the University of Virginia is involved in national, state and local initiatives. They advocate home-school-community partnerships to develop comprehensive, integrated learning and human service delivery systems.
Contact: Larry Decker, 804-924-0866;
led@virginia.edu.

**National Association of Partners in Education (NAPE)** provides leadership in the formation and growth of effective partnerships to ensure success for all students. Partners include parent organizations, businesses, health-care agencies, universities, the media, labor organizations, community clubs, foundations and government.
Contact: Jan Cox, 703-836-4880;
fax: 703-836-6941.

**The National Alliance for Restructuring Education** is a partnership of states, large school districts, foundations, corporations and non-profit organizations that are redesigning American school systems. They focus on new national standards, performance assessments, new technologies

and curricula, integrated social services and high-performance management systems.
Contact: Vicki Phillips, 202-783-3668; nceevicki@aol.com.

**The National Association for Industry-Education Cooperation (NAIEC)** is the national clearinghouse for information on industry involvement in education. It promotes industry/education collaboration in school reform, preparation for work through career education, and human resource and economic development at the local and state levels.
Contact: Donald Clark, 716-834-7047; fax: 716-834-7047.

**New Beginnings** is an interagency collaboration among the City and County of San Diego public schools, community colleges, the medical center at the University of California in San Diego, Children's Hospital, and two community-based service delivery agencies, Home Start and The Neighborhood. Their efforts provide integrated, comprehensive, school-linked services for participating individuals, families and children, including physical health, mental health, case management, information and referral, education and the development of community capacity-building.
Contact: Connie Busse, 619-527-6200; fax: 619-266-8675.

**The Philadelphia High School Academies, Inc. (PHSA, Inc.)** is a partnership involving the Philiadelphia School District, business, labor and community organizations. Together, they integrate academic skills with occupational training and, in turn, link education to steady jobs for Academy graduates.
Contact: Natalie S. Allen, 215-546-6300; fax: 215-546-9174.

**The PLANET Project (People Linking Across Networks)** is a consortium of the AT&T, PBS, FredMail, Big Sky Telegraph, TENET and PEARN networks where students have the primary responsibility for learning about and helping to solve issues of critical social importance. Collaborations have included such activities as writing petitions to the United Nations to protest conditions in Yugoslavia and fundraising to help purchase rope pumps for Nicaraguan villages that lack clean water.
Contact: Peter Copen, 914-962-5864; pcopen@igc.apc.org.

**Public/Private Ventures (P/PV)** researches and designs programs to promote the positive development of youth from disadvantaged communities. Their work includes creating innovative educational models for diverse groups of learners, ages 10 through 25, in over 150 sites nationwide.
Contact: Natalie Jaffe, 215-557-4408; ppvg@udcemail.udc.upenn.edu.

**Project SPIRIT** is a community empowerment model that unites parents, pastors, lay people, community leaders, academicians, business people and politicians to support and serve children. It is sponsored by the Congress of National Black Churches, Inc.
Contact: B.J. Long, 202-371-1091; fax: 202-371-0908.

THE GEORGE LUCAS EDUCATIONAL FOUNDATION

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# EDUTOPIA

NEWSLETTER OF THE GEORGE LUCAS EDUCATIONAL FOUNDATION

## LETTER FROM THE CHAIR

...for its use. Much of society is ...the Age of Information and ...tion, but we are leaving our children ...rs in the Industrial Age. We need to ...hat everyone in education is able to ...d their learning through access to interactive ...ultimedia and telecommunications technologies.

...I am always exp... ...tell my stories. In ... ...

...viewing ... ...e in Connecticut ... ...n digitized on computers at our studio at Skywalker Ranch; and I am able to have video conferences with my producer on location in North Carolina. The film industry, just like education, is feeling the impact of the digital revolution.

Making a movie is a collaborative effort among many people who have a clear idea of their roles. All members of the cast and crew bring their unique and varied experiences to the tasks and play a significant role in the success of a production. The investment we make in people and technological resources is an essential part of a comprehensive plan to bring together all of the various elements of filmmaking. Changes do not necessarily happen easily for any of us, but the technological revolution has changed forever the way movies are made. And many filmmakers are embracing these changes as we understand how we are able to reshape and advance our craft.

Even though the educational system is much more complex than movie production, the integration of technology with teaching and learning can have the same profound and rapid effect that it has had on filmmaking. For a variety of reasons, the educational community has not embraced the capabilities of the new technologies in the same way, and many people still question its value. I think much of the problem is caused by the fact that we don't have a shared vision of the potential nor do we have a clear set

As we continue our work to create and document a vision of a technologically-enriched educational system, myriad changes are shaping the way our children are thinking and learning right now. I am encouraged when I hear about the numerous programs that are challenging our traditional ideas about how school should be. And I applaud the hard work in which so many of you are involved. I want all children to feel as empowered and creative in their work as I am in mine. Education is at the root of everything we do; together, I hope we are able to transform the system into one that will meet the needs of a society of lifelong learners.

GEORGE LUCAS

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# *Edutopia* Update

Transformation is a pervasive theme in this country today as new technologies are redefining the way we work and live. We now shop, bank, and pay taxes from our homes, and phone and fax each other from airplanes. Computer chips in cars increase performance and enable us to find the shortest route to our destinations. Businesses are actively involved in changing the whole culture of work—how we do it, where we do it, when we do it. Adults are sometimes overwhelmed by technological changes. Children take these things for granted, having lived with them throughout their lives.

Many of us are involved in trying to transform the educational system to meet the changing needs of students in a changing world. Institutional change is never easy and does not happen overnight. The complex nature of education necessitates collaborations and a built-in capacity to sustain change over time. We must be willing to accept performance dips while not losing sight of the high standards we want students to achieve.

Successful transformation of education must include rethinking all the elements in the system. It begins with an understanding and a shared vision of what is to be accomplished. This vision must be created by the members of a community and be translated into an action plan with clearly defined roles for all. Continuous support and assistance are integral to the successful restructuring of the educational system.

Unfortunately, many in society expect schools to be transformed instantly and are unwilling to support the kinds of programs that would assure success. For example, research and common sense tell us that integration of technology with teaching and learning occurs most frequently when educators are comfortable with the equipment. This requires on-demand access to technology and on-going staff development; yet few schools or districts provide the time or resources to make technology integration a reality.

This issue of *Edutopia* looks at educational transformation from a variety of perspectives. George Lucas relates changes in filmmaking to what is happening in education. We've excerpted testimony Education Secretary Riley delivered to a Senate committee on the need for free access for education to the National Information Infrastructure. We include a description of a unique partnership of business people, educators and policy makers in the Great Lakes region that is changing how people understand the uses of technology. The power of technology in education is described in a research article that discusses the results of using the new technologies with students and teachers, and in a description of how assistive technologies are making a difference for people with disabilities. And finally, the Access to Information column identifies resources we hope you find useful as you strive to implement changes to the educational system.

Our work and information base continue to expand as we learn more about exciting programs that are reshaping teaching and learning. We encourage you to keep us informed about what is happening in your communities. The road to change is long and hard, but with sustained commitment to all children, we know that together we can develop an educational system that is truly world class.

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Opinions expressed in the newsletter are solely those of the authors. Comments by readers are welcome. Write to us at San Rafael or e-mail: edutopia@glef.org

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# Alliance for Technology Access Helps People with Disabilities Reach Their Potential

*by Russ Holland*

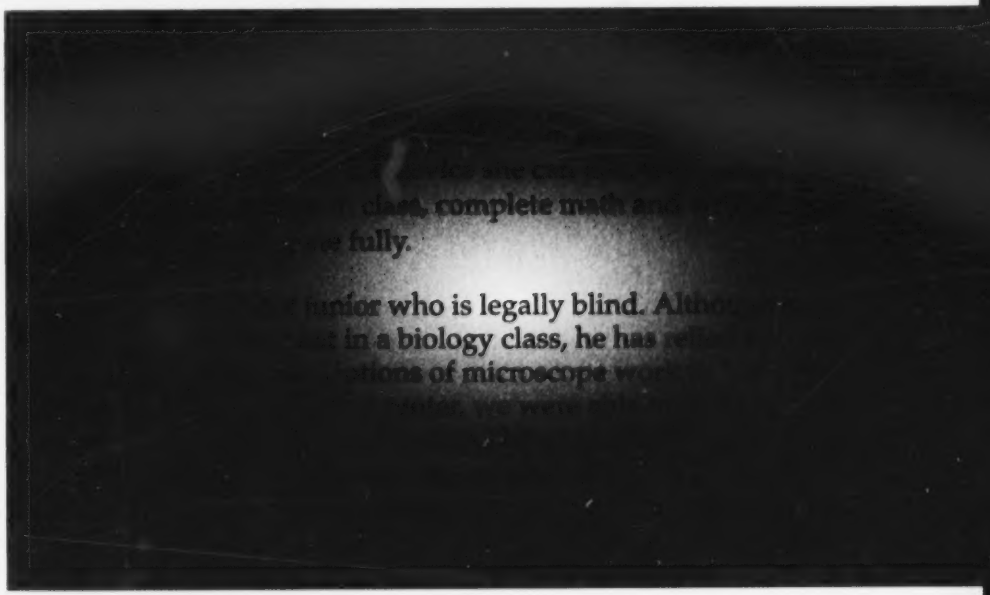
Perhaps no group stands to benefit more from the promise of new technologies than people with disabilities. Through the use of "assistive technologies"—technological solutions crafted to meet an individual's specific needs—thousands of people with disabilities have achieved greater independence in personal, social, recreational, educational, and vocational activities. Adults and students who are blind use them to read the newspaper, write novels, and conduct research in a library. Those with traumatic brain injuries use them to negotiate a complicated schedule of daily events and to sequence vocational responsibilities. And still others with spinal chord injuries use the technologies to drive, cook, and control the television. For the most part, these individuals are not using technology to accomplish extraordinary things, but to participate fully and independently in the normal activities of daily life—activities that able-bodied people take for granted.

Unfortunately, many people who could benefit from assistive technologies do not have enough knowledge or support to successfully integrate them into their lives. Simply finding out what technologies are available in this rapidly evolving field can be a daunting task. The potential user must then have the technologies customized to their needs, obtain financing, and develop the skills needed to use them effectively.

To help remove these barriers, a group of consumers, parents, developers, and vendors joined forces seven years ago to create The Alliance for Technology Access (ATA). Their mission was to find and share solutions and strategies that help people with disabilities lead more independent and productive lives. ATA has since evolved into a network of 47 centers throughout the U.S. and Canada, with 75 of the major vendors and developers of assistive technologies as members. Each of the centers is connected via telecommunications, so a consumer entering any center has access to the combined expertise of all ATA members.

Techspress, the ATA center in Utica, NY, is operated by the Resource Center for Independent Living. Our activities are partially financed by the federally funded Technology Related Assistance for Individuals with Disabilities (TRAID) Project in New York State. We provide specific information as well as referral and outreach services to an 18-county area of New York, and often field requests from other northeastern states, eastern Canada and other countries.

The activities of Techspress, as well as other ATA centers, can be broken down into three main areas: awareness, access, and application. Our efforts to build awareness include publishing newsletters as well as conducting demonstrations for schools, parent groups, advocacy organizations, and independent living centers. The goal is to help our target audience—people with disabilities, their families, special service professionals, and the general public—understand what assistive technologies are available, how they work, and what benefits they can provide.




Our second activity, access, helps potential users browse through the myriad technology options and become familiar enough with them to find the best fit. Visitors can try out various technologies in our center, and staff specialists help customize the technology for their individual needs. We also offer help in lining up potential funding sources, including educational, vocational, and other institutions. We collaborate with consumers, schools, employers, and vocational rehabilitation services to come up with the best possible technology solu-

*continued on page 8*



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# GTE's Pioneering Partners™—Business Leaders, Educators, and Policy Makers Fusing Technology with Teaching and Learning

*by Mary Kinney*

Faced with the need to increase the use of technology in schools and thereby bolster the economic competitiveness of their region, the Council of Great Lakes Governors in 1991 turned for help to GTE North, Inc. The resulting initiative, Pioneering Partners™ for Educational Technology, is based on a realization that is too often overlooked: The problem is not a lack of innovative, effective models of educational technology use, but a lack of mechanisms to ensure that those models become standard practice in every classroom.

Over the past three years, Pioneering Partners has itself become a model of a business-government-education partnership working to improve education through technology integration. Pioneering Partners invests in teachers, administrators, school board members, and others who have already created educational technology models, and helps them develop their leadership skills and their ability to share their ideas with others.

Each year, the partnership selects a total of 24 teams from the eight states that make up the Council of Great Lakes Governors: Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. These teams, which can include teachers, principals, technology coordinators, school board members, and business people, are selected on the basis of a proven track record in technological innovation.

Winning teams receive small grants earmarked for expenses related to disseminating their work to others, and a scholarship to a five-day leadership summit at GTE's Management Development Center. There, they receive specialized training to help them design and implement dissemination plans and improve the skills needed for strategic planning, coalition building, presentations, grant writing, and media relations.

GTE currently underwrites the cost of the initiative.

**...main goals of the te... ...ices" of technology in th...**

The telecommunications company also loans staff to coordinate the application and selection process, spread visibility and awareness of the program and teams, design and conduct the professional development summit, and provide coaching and tracking of team dissemination efforts. In addition they have created an electronic network, GreatLinks Net, that facilitates communication among winning teams and allows them access to Internet services.

One of the main goals of the teams is to share the "best practices" of technology in the classroom. They become resources for each other, spreading good ideas through "creative swiping." They also get opportunities to tell their stories to governors, legislators, and business and education leaders in ways that collectively highlight systemic issues that help or hinder the spread of educational technology.

For example, Wisconsin's Governor used input from Pioneering Partners teams in his state to help shape aspects of the state's Information Superhighway Act. The new law was ceremonially signed in the classroom of a Pioneering Partners teacher. Similarly, a coalition of educators in Michigan is working toward having their voices heard when the legislature rewrites the state's telecommunications act, putting to use the coalition-building skills they learned through Pioneering Partners.

In Illinois, Pioneering Partners teams were tapped by the Governor to help design a framework for schools, businesses, and communities to work together at local, regional, and state levels integrating technology into schools. And, in Ohio, Pioneering Partners winners have been named to state-level committees that are developing guides to help educators at the local level fuse technology with teaching and learning.

Teams have also demonstrated effective leadership at the local level. Using planning and grant-writing skills taught at the Pioneering Partners Summit, for example, a 1992 team from LaGrange, IN, created a technology vision for their school's future. The document won a school board commitment of $100,000 over two years, and that amount was matched by a local foundation. What began as a project involving a few students in one classroom will soon impact all of the school's 475 students and 30 faculty, as well as many of the 30,000 residents of LaGrange.

While evidence from blue-ribbon panels often fails to convince the public of the value of technology, a successful demonstration in a community setting is often a much more powerful persuader. Such was the case in Akron and Copley, OH, where a Pioneering Partners team amassed some $2.5 million worth of goods, services, and financial gifts from nearly 2000 sources to construct and equip SEABASE America, a set of simulated undersea research stations that allow students in local schools to undertake elaborate cross-curricular learning projects.

Like many other teams, a 1993 team from Waterloo, NY, recognized that educators need to become activists to

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# Educational Technology, Teaching, and the Development of Complex Skills

*by Jay Sivin-Kachala and Ellen R. Bialo*

When does technology help students develop complex skills—learning that goes beyond mere rote memorization—such as the ability to write well or to engage in mathematical problem solving? Recent research points to several key factors. Technology makes a difference when the teacher has a clear vision of what students are to learn and how technology can help. Success also requires that the teacher include in his or her instructional plan ways to give students guidance in the processes and thinking strategies that make up the skill. Finally, the teacher needs to be actively involved in a variety of roles—sometimes a lecturer, sometimes a coach; one day a consultant, the next day an editor.

What role should the technology play? Research suggests that technology works best as a supporting tool—making complex processes or creative experiences either possible or easier to accomplish. Technology offers new ways to provide meaningful, real-life contexts for learning. And telecommunications technology allows students to collaborate with peers and experts across the country and around the world.

In *The Report on the Effectiveness of Technology in Schools 1990-1994*,[1] we identified several examples of successful integration of technology and exemplary teaching practices. Below we offer three such examples.

In one example, middle-school teachers in Delaware participated in a technology-enhanced, writing improvement project.[2] The goal was to improve the overall quality of students' writing; specifically, to have students show improvement in clearly expressing the main point of their writing, logically organizing their ideas, effectively using supporting information to elaborate on the main point, and correctly applying the rules of standard English usage.

Teachers followed the Delaware Writing Process instructional model, which stresses planning (also known as pre-writing), then writing, and then revising. Teachers who needed further training in this model received extensive in-service instruction. Participating teachers also received in-service instruction in using computer hardware and software and in integrating computer use with instruction in the writing process.

Having focused goals and a clear instructional model helped to ease the task of choosing appropriate software for word processing and writing process instruction. For example, one software program presents prompts that guide students through the stages of the writing process, providing students with reinforcement of teacher-led instruction. This enabled students to receive the guidance they needed as they worked, even when the teacher was busy with other students. Word-processing software was an essential tool during the revision stage because the software makes revision easy to accomplish. (Before word-processing software, revision meant either totally rewriting a composition by hand or having a final paper full of erasures and cross-outs.)

Teachers' concerns about managing a classroom with computers—a new experience for many teachers—were handled by teacher trainers. The trainers made periodic visits to classrooms to help solve management problems. Between these visits, teachers with questions could consult with a trainer over the telephone.

Students received instructional guidance and feedback in a variety of ways. Teachers were observed giving whole class and mini-lessons on aspects of the writing process. They held one-on-one writing conferences. Some teachers organized peer-to-peer conferences so that students could help each other improve their written work. Teachers frequently monitored students as they worked on their writing assignments, offering assistance as necessary. This project was clearly not an instance of having teachers plug students into computers, walking away, and leaving the technology to do the rest.

**...offers new ways to pr... real-life contexts for ...**

What were the results of the project? In comparison with students not exposed to the computer-enhanced instruction, project students demonstrated significantly greater improvement in the overall quality of their written work. They showed superiority in their ability to organize their ideas, to support their ideas with specifics, and to use standard English correctly. Furthermore, project students showed an increase in their enjoyment of writing over the course of the school year, whereas the students without the benefit of technology did not. Finally, teachers reported that they enjoyed incorporating computers in their writing instruction.

In another example, upper elementary school students from districts throughout the Southeast U.S. received innovative instruction that incorporated dramatic videos to teach mathematical problem solving.[3] The goals of this approach were to improve students'

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# Education Secretary Richard Riley on Free Usage of the National Information Infrastructure

*Note: This article was excerpted from testimony given by the Secretary on May 25, 1994 to the U.S. Senate Committee on Commerce, Science, and Transportation on the proposed Communications Act of 1994. Although the full Senate did not act on S. 1822, the issues are central to the debate over how to ensure greater access for students and educators to the emerging National Information Infrastructure.*

The term "National Information Intrastructure" (NII) is used to describe many different things. In its most literal sense, it is a seamless web of communications networks, computers, databases, and consumer electronics that will put vast amounts of information at our fingertips. It will tie together our telephone system that reaches 98 percent of homes; the cable systems that pass more than 90 percent of homes; the broadcast television and radio stations; the cellular telephone system and other wireless networks; satellites that soon will offer programming directly to owners of dishes no larger than a salad bowl; and enormous databases of information.

But the NII is also much more than that: it is an essential tool... and an integral part of our future education system.

I am here as an education spokesperson, representing close to 49 million young people and several million teachers... I have come to tell you that it will be absolutely impossible to educate the coming generation of young people to high standards of excellence—if their access and use of the NII is seen as a secondary consideration to broad-based commercial purposes.

When Vice President Gore articulated the goal of connecting every classroom, library, and hospital to the NII by the year 2000, he defined an ambitious goal for this nation...

It is my very strong belief that free connections to the NII may not be enough. If we want young people to actively use the technology of the future so it becomes second nature to them, then we must go a step further and provide... free usage of the telecommunications lines that will connect school children and young people to new sources of knowledge.

In short, I believe that connecting up our schools and providing free usage, or usage that at least is as inexpensive as possible, is the right way to go.

The principle of "free" public education for all children is the bedrock of our democracy. Not cheap, inexpensive, or available for a fee but in its very essence "free." We believe in this basic American principle because we know its long-term value for society as a whole.

A child or young person who gets an education of high standards and excellence becomes the worker you can depend on, a better citizen, and a strong consumer... An early investment in education should have broad application in creating a rate structure for the future use of the NII.

Educational institutions, large and small—schools, libraries, literacy centers, early childhood centers, community colleges, and universities—should have access and usage of these services. If we can't connect the NII with all educational institutions at once, then schools, libraries, and literacy centers should be at the top of the list...

I believe that this early investment in education will provide a handsome and long-term economic return to business and to the nation as a whole. For this is a good time, as a businessman once told me, to "smell the future," or to think long-term.

If we want to create a broad-based, well-educated work force that has a capacity to use information to keep our economy growing, then we need to hook this future work force into the NII early.

At a different level, any right-thinking corporate executive who wants to create a market recognizes that giving young people access to the NII early on will, in all probability, create a lasting consumer who comes back again and again to use the NII.

Now, there is probably someone in the back of this hearing room who thinks I am whistling Dixie, who has his or her calculator out trying to figure out the cost of this early investment in education.

But, if you are consumed with the short-term costs of giving schools access and use of telecommunications lines to get on-line, then you are stuck in the mindset of the 1980's, which did this nation no good at all.

This is something every business person should understand. Every year millions, if not billions of dollars are being spent by business, our community colleges and our public universities on remedial education.

If we want to get out of the business of remedial education, if we want to create a well-educated and world-class work force, this is the time to get it right—to raise our standards and give our young people the access and the tools they need to get a world-class education.

I am dedicated to the principle of competition within a marketplace, and to the ability of companies to receive a fair rate of return on their investments in building the information superhighway.

But we cannot allow this highway to become completely lined by billboards, or a road that leads only to virtual movie theaters and arcades. The NII has enormous potential to foster learning across the land...

This is a very critical moment in the history of American education. For the past ten years, we have worked to create a broad-based, bipartisan consensus about how to reform American education... We cannot hope to achieve...very high standards if our children keep using a Number 2 pencil and our teachers keep using the blackboard and a ditto sheet.

It will be absolutely impossible to give a world-class education to every American child without the proper use of these new information tools.

Here it is important to recognize that in the next ten years this nation will have more children and young people in school (than at any time) since the Baby Boomers came through our school systems in the 1950's and 1960's... By 2004, we will have approximately 55.7 million going to school, seven million more than we have today.

The majority of these young people will not be suburban kids. They will be Hispanics, African-Americans, Asians, and new immigrants. If we ignore their education, if we continue to give them a watered-down curriculum and link their schools up last—in the year 2005 or 2010—we will find this country in an economic pickle of the first order. We will have a work force that does not know how to work...

What I have come to understand so well is that these new resources must be central to our conception of public education. These technologies are a way to individualize instruction; a powerful resource for supporting teachers and their professional development; a vehicle to connect students' learning to the real world; a way to connect schools to the home and community; and a means to extend learning beyond the traditional 9-to-3 school day.

(A recent national commission concluded) that we must increase both the amount and the quality of instructional time for our students, and the NII will help to make this possible by allowing students to learn in homes, libraries, and other sites, both during and after school. Small schools, schools in remote rural areas, and schools wracked by poverty would all have access to the same rich learning resources...

The legislation before this committee presents an opportunity to take this critical step—enabling schools to have access to the information highway over the long term. Of course, the rate language in S. 1822 is only the first step to making these services an integral part of American education. Access to telecommunications is a serious problem for the nation's teachers, for reasons that go beyond cost.

While nearly every school has computers, school traditions frown on teachers having telephone lines in their classrooms. Opportunities for teachers and school staff to learn how to use this technology and integrate it into instruction are all too scarce. Few schools budget adequately for ongoing technical support for these new tools. Only when these and other steps are taken will we truly be able to end the isolation of our nation's classrooms...

...You should also know that teachers can use this technology to alleviate one of the largest problems of the teaching profession—a disconnection with their peers. Networks of educators are springing up across the nation, addressing long-felt needs. We have seen the successes of teacher networks, and want to help other teachers replicate them...

That is why I believe the work of this committee is so very important to the future of American education. We need to "smell the future,"—to raise our standards for every student and give students, teachers, and parents the access they need to the NII so they can prepare themselves and our children for the world of the 21st Century.

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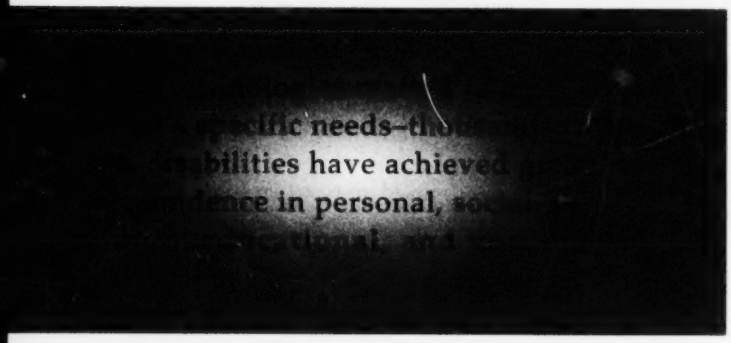
tion or "prescription."

The application and "fine tuning" of this prescription is the third activity of the ATA centers. We provide training and support for the user, as well as for his or her family and other involved professionals, to help ensure that the technologies are fully and successfully used. Experience has taught us that this support is critical to the process of integrating assistive technologies into people's lives. Otherwise, these expensive technologies may end up in a closet, having been rejected as too difficult to learn or too time-consuming to administer.



Each of these activities—awareness, access, and application—are vital to our mission of helping ensure universal access to assistive technologies. Unfortunately, at our current fairly frantic pace, we estimate it would require 150 years to consult with all of the school-age children currently identified as potential beneficiaries of assistive technologies.

To counter this problem, we are now working to help special education professionals develop knowledge about assistive technologies as well as the capacity to provide access services locally. Through professional development institutes and ongoing support activities, we are helping local agencies develop their own collaborative consulting teams. All of the above activities can then be provided and supported locally in a more time- and cost-effective manner.

The goal of Techspress is to provide every person with disabilities access to technologies that will help them participate fully in the activities and environments of their choice. The collaboration made possible through ATA's network of centers is our single greatest resource, enabling us to remain abreast of new developments and bring state-of-the-art resources to central New York. These resources, in turn, have enabled us to offer increased choice and independence to many people with disabilities. The ATA model and strategies for supporting people with disabilities in their search for appropriate assistive technologies are described in a new book, *Computer Resources for People with Disabilities*.

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abilities to "identify and define... problems *on their own*" from complex situations that mirror real life, and to apply mathematical principles to solve such problems. Another objective was to help students understand the value of mathematics in solving the complex challenges of daily life.

The problems were presented through dramatic video adventures. For example, in one adventure, the protagonist found a wounded eagle during a fishing trip, after having hiked a considerable distance from his car. The challenge was to find the fastest way to get the eagle to a veterinarian, and to figure out how long it would take. Prior to the fishing trip scene, the video introduced two of the main character's friends, both of whom knew how to fly an ultralight aircraft. Students learned details about flying the ultralight that would later impact on decisions about using it in the rescue. Students had to choose between two different rescue vehicles (the car and the ultralight), three possible rescuers (the main character and his two friends), and several possible travel routes, and to apply specific mathematical principles to come up with the best rescue strategy. To arrive at the best possible solution, the students first had to identify what they needed to know, search for specific information, develop a variety of solution options, and then compare the results.

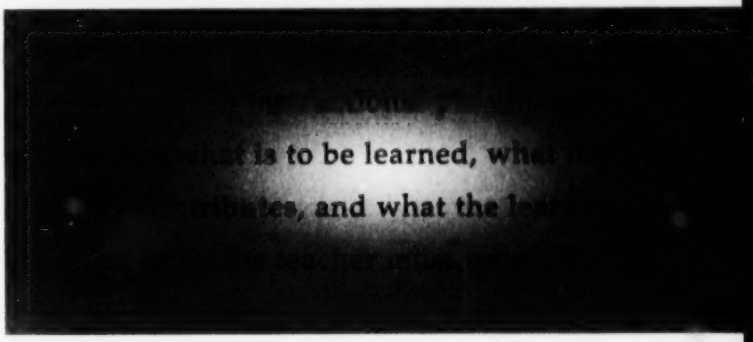
The video scenarios proved to be highly motivating to students. From the students' perspective, mathematical problem solving became a vehicle for participating in interactive dramas. Suddenly mathematics had a purpose that was personally relevant to the students.

The newest versions of the videos were developed as computer-controlled, interactive videodiscs. The computer software and the videodisc make it easier for students to search for the data they need to develop various solution options.

Teachers played a variety of roles in the instructional process. They explained the basic premise of the activity. They organized the class into small groups that could work together effectively. (Having students work in cooperative groups was important because this encouraged students to develop multiple solutions and stimulated students to articulate the reasoning behind their choices.) Some teachers using this instructional method for the first time presented the video, then helped students to structure the sub-problems before having them begin work in groups. Teachers monitored students as they worked in their groups, providing guidance when a group seemed headed into a "blind alley." Teachers also had to decide when not to intervene, since one instructional goal was to have students develop the problem-solving skill of self-monitoring. During group presentations to the whole class, teachers moderated the debates that inevitably developed. To help students generalize the mathematical principles, some teachers then added "what if" questions based on the same story context but with an alternate set of facts, or presented problems that related the principles to new contexts (e.g. preparing for the New York-to-Paris flight of Charles Lindbergh).

Did this innovative instructional approach make a difference in student learning? In comparison with a matched control group, students using the video-based learning method demonstrated superior performance in solving simple and multi-step math word problems. These students were also better able to generate the "subgoals" that needed to be considered while solving complex problems and to relate specific mathematical calculations to each subgoal. Of equal importance, the students showed improved attitudes toward mathematics and its application to everyday life.

Computers and telecommunications technologies can be combined to provide an exciting environment for complex skill development. For example, the National Geographic Society (NGS) Kids Network organizes science research teams of students throughout the U.S., Canada, and other countries—with team members linked via telecommunications.[4] The learning goals include familiarity with the scientific method; the development of mathematical problem-solving, graphing, and map-reading skills; mastery of science content related to air, water, and land pollution; and understanding the power of the computer as a research tool.




Word processing, graphing, and mapping software help students to collect and analyze data at each local site. Students then telecommunicate to share their data with team members around the world. (Mapping becomes personally relevant to students after they have had the chance to communicate with their peers at other sites represented on the maps.) Students are also linked to professional scientists, who guide students in the analysis of their data.

Teachers are indispensable to this student-centered

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approach to science instruction. Teachers are responsible for organizing students in teams, managing their access to materials, facilitating student brainstorming when problems arise, modeling problem-solving and investigation skills, leading small-group and whole-class discussions, observing students as they work, and evaluating student learning.

In an evaluation of this project, students demonstrated superiority in the use of graphs as research tools, in data interpretation, and in mapping skills compared to students receiving traditional science instruction. Students participating in the NGS Kids Network also developed a deeper understanding of how students around the world are both different and similar.

Studies of these and other instructional improvement projects demonstrate that educational technology can serve as a useful tool in the development of complex skills—but not in isolation. Successful teaching of complex skills greatly depends on an instructional plan that carefully considers what is to be learned, what the technology contributes, and what the learning environment and the teacher must provide. The instructional plan must ensure that students receive ongoing guidance—guidance that often comes from the teacher but that may come from instructional materials or other students as well. Student collaboration is often an important aspect of the learning process. Teachers are called upon to play a variety of roles; to be a learning environment manager as well as an information provider. Since many of these roles and the technology are new to most teachers, professional development and ongoing support are important requirements for success. As has always been the case, the teacher is ultimately responsible for the learning that takes place in his or her classroom.

**Endnotes**

[1] J. Sivin-Kachala, and E.R. Bialo, *The Report on the Effectiveness of Technology in Schools 1990-1994* (Washington, DC: Software Publishers Association, 1994).

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[3] Cognition and Technology Group at Vanderbilt University, "The Jasper Experiment: Using Video to Furnish Real-World Problem-Solving Contexts," *Arithmetic Teacher*, April 1993; Cognition and Technology Group at Vanderbilt University, "The Jasper Series as an Example of Anchored Instruction: Theory, Program Description and Assessment Data, 1992," (in press; to be published in the *Educational Psychologist Journal*); Cognition and Technology Group at Vanderbilt University, "The Jasper Series: A Generative Approach to Improving Mathematical Thinking," *This Year in School Science*. (Washington, DC: American Association for the Advancement of Science, 1991).

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generate new funding for technology. They worked on behalf of a campaign to annex a small, neighboring school district, which made the district eligible for an additional $20 million in state funding over the next decade that will be used for program enhancements with an emphasis on technology.

Pioneering Partners teams have also re-engineered their own classrooms, empowering students to acquire and hone information processing skills. Their students know how to add value to information. Many have learned how to work in teams. They communicate with others on-line and create information-based products such as custom-designed toys on digitally controlled lathes, mathematical models of miniature golf courses, and simulations of undersea research stations.

These students explore and solve real problems in their own communities. From helping city fathers plan for the year 2010, to finding and correcting wasteful practices in their schools to save energy and reduce power bills, to focusing public attention on environmental issues by designing and creating multi-media presentations, they are contributing to their own future.

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## Networks and Organizations

**The Buddy System Project** places technology in the homes and classrooms of Indiana students in grades 4-5 through a competitive grant process. Local coordinators are given training to facilitate Buddy's mission of extending learning through cooperative home-school activities.
Contact: Alan T. Hill, (317) 464-2074;
fax (317) 464-2080

**The Iowa Communications Network (ICN)** is a statewide fiber optic network with 125 endpoints serving a community of learners from preschool through adults. Full motion interactive video enhances learning opportunities for online users throughout the state.
Contact: Pamela Adams Johnson, (515) 242-4180;
fax (515) 242-3155; pjohnson@po-1.star.k12.ia.us

**The Center for Applied Special Technology (CAST)** is a national organization designed to expand opportunities for all people, especially those with disabilities. Focusing on innovative uses of technologies, CAST pursues its mission through both direct services and research and development.
Contact: David Rose, (508) 531-8555; fax (508) 531-0192

**Hawaii FYI** is an on-line service that puts K-12 schools, government offices, libraries, and homes in touch with information and resources unique to Hawaii and around the world. Resources for K-12 students include access to numerous discussion groups and databases.
Contact: Arthur F. Koga, (808) 586-4636; fax (808) 586-4625;
akoga@hinc.hawaii.gov

The University of Washington's **Center for Educational Renewal** seeks the simultaneous renewal of Pre-School-12 schools and the education of educators. It links universities and schools through its National Network and conducts research on the conceptual and practical aspects of simultaneous renewal.
Contact: Roger Soder, (206) 543-6230; fax (206) 543-8439;
rsoder@u.washington.edu

**The Texas Education Network (TENET)** is a statewide telecommunications network for K-12 educators. Serving more than 35,000 users, TENET provides electronic mail, databases, numerous Internet resources, and a comprehensive staff development program.
Contact: Connie Stout, (512) 471-2472; fax (512) 471-2445;
cstout@tenet.edu

**The National Center to Improve Practice Network (NCIP$^{NET}$)** is an electronic mail and conferencing system focused on helping students with disabilities. The system links administrators, practitioners, parents, and consumers and shares information on technology and media.
Contact: Denise Ethier, (617) 969-4529;
fax (617) 969-3440; DeniseE@edc.org

**The National Center for Restructuring Education, Schools, and Teaching (NCREST)** is a networking and research organization. It offers services to inform and connect teachers, parents, and states through publications, conferences, and workshops.
Contact: Janine Ley-King, (212) 678-3432;
fax (212) 678-4170

**The Coalition of Essential Schools (CES)** supports secondary schools, districts, and states in improving student learning through research, professional development, and other cooperative activities. Their journal, *HORACE*, is published five times a year.
Contact: Lisa Lasky, (401) 863-2847; fax (401) 863-2045

**Parents Let's Unite for Kids (PLUK)** is a coalition that provides support to parents of children with all types of disabilities. PLUK offers a monthly newsletter, various support programs, and referrals to other support groups around the nation.
Contact: Kathy Kelker, (406) 657-2055; fax (406) 657-2061;
plukmt@aol.com

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**The California Middle Grades Reform Model** is a statewide network of 405 middle schools in 36 regional partnerships. The network is helping to improve education through various collaborative efforts including local and statewide professional development activities, and a bi-monthly faxline that shares information on such issues as flexible scheduling, advisory programs, and interdisciplinary team teaching.
Contact: Saundra Davis, (916) 322-2786; fax (916) 322-3390

**The National Information Center for Children and Youth with Disabilities (NICHCY)** is an information clearinghouse providing free information on disabilities and disability-related issues. Available to the general public, NICHCY also offers referrals to other organizations and a variety of publications in alternative formats (braille, audio tapes) and in Spanish.
Contact: Information Specialist, (800) 695-0285; fax (202) 884-8441; nichcy@capcon.net

## Telecommunication Resources

**Global SchoolNet** is a conference that serves as a centralized information source for online learning projects. Students and teachers can network with others around the world to share project ideas.
Contact: Al Rogers, (619) 475-4852; info@acme.fred.org

**NetTeach News** is a newsletter that provides telecommunication resources for K-12 educators. Available in both paper and electronic forms, it documents resources, applications, and events on the Internet.
Contact: Kathy Rutkowski, (703) 471-0593; kmr@chaos.com

**InterNIC Information Services** is a clearinghouse, funded through the National Science Foundation, offering Internet support. Documentation, training materials, and online directories are available.
Contact: Reference Desk, (619) 455-4600; fax (619) 455-4640;
Gopher: is.internic.net
URL: http://www.internic.net
refdesk@is.internic.net

**The Internet Services List** is a bimonthly compilation of hundreds of public-access Internet resources. The list is available in a number of ways:
Gopher: gopher.csd.uwm.edu (select Remote Info Serv...)
URL: http://www.uwm.edu/Mirror/inet.services.html
Email: inetlist@aug3.augsburg.edu (replies w/ lists)
Contact: Scott Yanoff; yanoff@csd4.csd.uwm.edu

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# EDUTOPIA

THE NEWSLETTER OF THE GEORGE LUCAS EDUCATIONAL FOUNDATION

## LETTER FROM THE CHAIRMAN

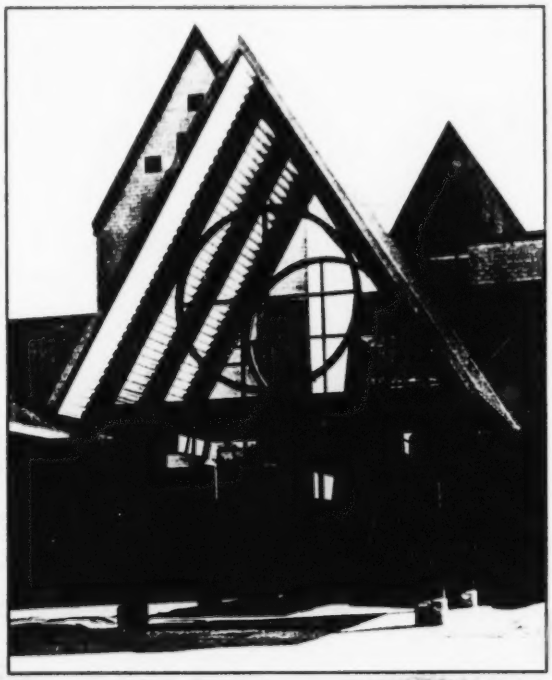
In the old days, movies were made in very different ways than they are today—most were shot on location, needed a huge cast to portray crowd scenes, and did not incorporate anything but what the eye of the camera could capture. Today, with the advent of digital technology, filmmaking has forever moved out of the Industrial Age and continues to evolve to keep pace with rapidly-changing technologies and techniques.

To accommodate these dynamic shifts in filmmaking, I built a post-production facility that supports the creative processes of today and can be adapted to the demands of tomorrow. The baseboards and panels in the floors are removable to allow easy access to the wiring. The recording stage has walls that can be rearranged to produce the highest quality sound. In designing this building, my goal was to create an environment that is ideally suited to support the creative work that needs to take place there, and which can evolve as the nature of the work changes.

What does all of this have to do with education? If we are going to transform education, so too must we transform school facilities. They need to be flexible and adapt to the changing nature of teaching and learning. I am excited when I hear about some of the newer schools being built that reflect the importance of an environment in supporting creative endeavors and new ways of teaching and learning. These dynamic and versatile schools enable learners to actively pursue information and learn in a variety of ways. The spaces support student and teacher inquiry through both the latest technologies and hands-on learning. Places for group activities as well as smaller areas for individual work and study have been built, and the technological infrastructure provides interactive multimedia and telecommunications technologies throughout.

Unfortunately, nearly one in three of the over 100,000 school facilities nationwide are either unsafe or unsuitable for learning. Inadequate space and limited technological infrastructure are far too common. The challenge for education is to ignite a passion for learning and provide places that can help keep it strong throughout a lifetime. If we have a commitment to our children and a vision of what exciting and appropriate educational environments could be like, then we can do nothing less but create the best schools.

GEORGE LUCAS



*The entrance to the Benjamin F. Butler Middle School in Lowell, Massachusetts.*

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# *Edutopia* Update

Just as the little red schoolhouse was outmoded by changes in education and society, the box-like, closed-door classrooms of our childhood are inadequate to support technology and modern notions of teaching and learning. Cooperative learning, hands-on projects, interdisciplinary curriculum, and the uses of interactive multimedia and telecommunications demand more flexible learning environments. Increasingly, a school's design and infrastructure are influencing what activities are possible and how they are conducted. In most cases, that influence is negative, since more than 80 percent of our schools were built before the advent of personal computers and of new ways of teaching and learning that promise to transform education.

Can educators create exciting experiences in old receptacles? Many dedicated teachers are moving ahead despite the obstacles their facilities impose. At the same time, a growing number of communities are building facilities that open up an exciting new world of possibilities. Versatile areas for individual projects are combined with spaces for smaller group work and whole-class activities. A sophisticated technological infrastructure links students and teachers with each other, with their communities, and with the rest of the world. Combined-use facilities, such as meeting rooms, health clubs, and museums, allow schools to be used more efficiently for more hours and invite the public in, restoring the school's place at the center of the community. Finally, the buildings and their surroundings are designed to encourage curiosity and learning about structure, engineering, aesthetics, and the natural environment.

The process by which such schools are created also breaks with tradition. Future users of a school—students, teachers, staff, and community members—are being asked to create a vision for their new facility. These stakeholders bring a variety of fresh perspectives to the table, resulting in schools that are more creative, inviting, and conducive to learning. Their involvement in collaborative planning helps new facilities open with a renewed sense of pride and commitment.

The articles in this issue of *Edutopia* explore how facilities can be designed and built to enhance teaching and learning. An architect and a district technology specialist take us on a tour of a new school in Lowell, Mass., designed around the theme "Enhancing Teaching and Learning Through Technology." One of the leading researchers in the field reviews the literature on the relationships between learning and school environments. An administrator in Stockton, Calif., describes how students, with help from teachers, staff, parents, architects, and the local community, have drawn up plans for an exciting new campus. The editor of a new book on school facilities offers some tips for planning a facility that will meet the demands of a changing world. A foundation executive reminds us not to forget the magic of special places. And the Access to Information section provides pointers to a number of resources that can help you delve further into school facility issues.

We are busy working on a video and resource document to illustrate a vision for education in the future. As we conduct our research, we are continually pleased to discover new places that are redefining teaching and learning. Thanks for keeping us informed about the exciting work in which so many of you are involved.

*Edutopia* Staff



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# A Design for the Information Age: Benjamin F. Butler Middle School

Laura Ann Wernick
Steven Arnoff

In 1985, pushed by rising student enrollments and inadequate and deteriorating facilities, the City of Lowell, Mass., embarked on a massive school rebuilding program. One of the highlights of the program is Benjamin F. Butler Middle School, built to replace a hundred-year-old facility that was literally crumbling. The new school was a recent winner in a national design contest.

Butler's innovative design was influenced from the start by a collaborative team of teachers and administrators from Butler, as well as faculty from the College of Education at the University of Massachusetts Lowell. The team worked to ensure that the school's design would clearly reflect the school's theme: "Enhancing Teaching and Learning with Technology." Their focus was on ensuring children had the appropriate space and tools for cooperative learning and teaching experiences. The team developed a two-part model for using technology: first, as a way for students to quickly and easily access information, and second, as a way for students to communicate what they have learned to others. They determined that the facility had to support today's state of the art technology as well as have the capacity to adapt to the technology available in the next ten years.

The success of the finished school is a fair measure of the clarity of their vision. Immediately upon entering the school, a visitor faces a two-story high Information Media Center (IMC) filled with electronic and traditional print resources. Both physically and philosophically, this is the heart of the school. The IMC integrates traditional library functions with new information technologies. It has CD-ROM reference stations, automated checkout capabilities, and computer connections that allow users to access information from all over the country. A school-wide computer network allows children, teachers, and administrators to use the IMC electronically from almost anywhere in the building.

Technology's symbolic place at the core of the educational program is reinforced by two large project rooms adjacent to the IMC on each floor. On the ground floor, these spaces are technology education rooms: a computer-aided design lab and a technology shop. Here children draft their projects on a computer and then build them in the machine shop. One of the second-floor project rooms is a home economics classroom with a small computer area and computers at each kitchen set-up. The other is a general-use computer lab used by history, language arts, and mathematics classes for projects that require each child to have access to their own computer.

All classrooms have a number of computers connected to a school-wide academic network, and teachers are requesting more. A separate, secure administrative network allows teachers ready access to students' grades, attendance, and personal records right from their classrooms.

A two-way video network in each classroom allows children to participate in a science demonstration, a student play, or a special lecture taking place in another classroom. This cuts down on the logistics of moving and seating children and aids interdisciplinary teaching efforts. Cable and satellite hook-ups give teachers and students access to a wide spectrum of distance-learning options and educational programming. *Continued on Page 10*



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# Learning and School Environments

Gary T. Moore

It is no secret that there is a crisis in America's school buildings. One urban district, for example was recently found to have more than 10,000 fire code violations in its schools. A separate inspection in the same district found fire doors that didn't work, classroom doors that didn't close, broken toilets, crumbling plaster, potholed playgrounds, and malfunctioning heating systems. Nationwide, 74 percent of school buildings were built before 1970 and 12 percent are considered inadequate, because they are too old, too small, have deteriorating mechanical systems and/or seriously need window replacement.[1]

The urgency of the situation is obvious. Our school facilities are a tangible symbol of our commitment to education, and the message is not lost on students. Student attitudes about education are a direct reflection of the quality of their learning environment, according to a Carnegie Foundation study.[2]

Many professional educators and others understand that the physical characteristics of schools can directly influence learning, while others ignore this connection. Despite the importance of the issue, there is relatively little hard research on the topic. What evidence there is counsels us that the quality of the physical environment of educational facilities does matter to the process of learning and to educational achievement.

Consider a few examples:

*Small schools are better.* Relative to large schools (1,500 or more students), smaller schools (around 500 students) offer more opportunities to participate in extracurricular activities and to exercise leadership roles.[3] Student satisfaction is higher, participation in student organizations is greater, crime levels are lower, and student misconduct is less serious in small schools.[4] Other things held constant, more classes are taken per student, math and verbal ability is higher, and overall student achievement is higher in smaller schools. Smaller schools benefit African-American and urban students in particular.[5]

*Smaller class sizes and lower class density are better.* Another feature on which there is considerable evidence and which has powerful architectural implications is class size and density. As class size decreases, voluntary participation increases, classroom management improves, student attitudes improve, teacher stress decreases, and teachers are more likely to try innovative teaching techniques.[6] Conversely, high density conditions have been found to lead to increased aggression, decreased social interaction, and greater noninvolvement. In addition, as class size decreases (e.g., around 15 students with 1 teacher), students outperform matched groups of students in larger class sizes (over 20 per class) on all subjects, but especially in reading and mathematics (average improvements of 15%). These results are the same even when the larger classes have the additional benefit of a full-time teacher aide. The findings are consistent for all K-3 grade levels and in rural, urban, suburban, and inner-city locations.[7] Follow-up studies have shown that students in smaller class sizes in the early primary grades still have significant advantages two years later. Performance gains in different schools ranged from 11-34%, with the greatest gains being for inner-city schools and minority students.[8]

*Other architectural features affect learning.* There is empirical evidence about a range of other architectural factors affecting education. For example: (1) Thermal factors affect task perfor-

mance, attention spans, discomfort, and student achievement.[9] (2) Short-term noise and poor acoustics are linked to classroom distraction and to lower student and teacher morale.[10] (3) Long-term noise from nearby streets leads to significant increases in blood pressure, decreased concentration, increased errors on difficult tasks, and greater likelihood of giving up on complex tasks.[11] (4) Spatial density and crowding increase behavioral problems, aggressive behavior, and distraction on complex tasks, and decrease satisfaction.[12] (5) Classroom furniture layouts influence persistence, participation, and attitudes toward class and other students.[13] (6) Windowless classrooms lead to more negative student and teacher attitudes.[14] (7) And private or secluded study spaces reduce visual and auditory interruptions, increase privacy, contribute to longer attention spans, lead to more student questions, make learning materials more accessible, and increase literature use.[15]

In summary, there is mounting evidence that many characteristics of the physical, designed environment of schools can and does affect attitudes, behaviors, and academic achievement. Some of these effects result from a direct impact of the built environment on education, while others are indirect linkages between architectural characteristics and intervening psychological, physiological, and behavioral factors like cognitive fatigue, distraction, motivation, emotional affect, anxiety, or communication.[16] The bottom line is that a well-designed and well-maintained facility can, and does, make a difference in our children's lives.

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# A Blueprint for Making Learning Real: *Lincoln High West Campus*

**Linda Myers**

"What part of your education do you remember?" In 1991, this question was posed to more than 200 students in the Lincoln Unified School District in Stockton, Calif. They responded more or less in unison: "Science Camp—it was real!" As one youth explained, "I can't sit in rows and just listen. You've got to make it all more real!"

This oft-repeated plea became the cornerstone of our planning for a new learning environment known as the Lincoln High School West Campus. Our goal during the three-year design phase has been to create an environment that allows students to have real-life experiences; experiences that relate to their futures.

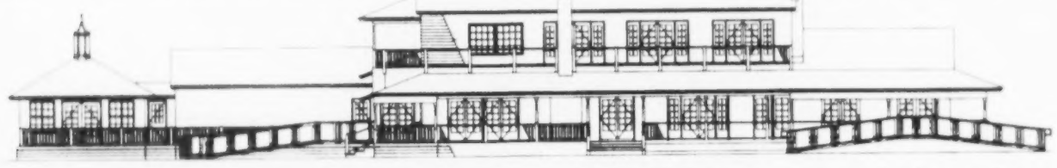
We were fortunate to start the planning process with an unusual site, the Brookside Farm, a 40-acre farm considered a local landmark by Stockton residents. In addition, a local developer donated a 50-acre natural delta site bordered by the San Joaquin River—the main shipping channel linking the Port of Stockton to San Francisco. This remote site will be used for in-depth research of delta life and astronomy, and as a science camp for the district's elementary and middle grades students.

The design and planning for the sites were placed in the hands and minds of the students who will learn there. Since the fall of 1991, the students have been walking on the sites with their teachers and community mentors, talking, imagining, and sharing ideas and feelings. Their ranks included students from every grade level as well as graduates. Students who had dropped out of school were personally invited to serve on the committee. There were students with special needs, and students who were new to the area, the culture, and the county. Their mentors were parents, other Lincoln families, retirees, businessmen, teachers, other staff, Lincoln Unified board members, and staff and students from local colleges. The process was coordinated by two architects and a consultant located through a nationwide search.

The planning committees were charged with the task of creating an environment that would excite the minds of learners. They identified learning needs and dreamed of environmental features that would meet those needs. As they moved from visions to concrete examples, the architects guided them through identifying ambient qualities (atmosphere, color, texture, etc.) and physical implications. Finally, after all the designs were finished, the reviews completed, and the costs estimated, the Lincoln Board of Trustees approved the plans in October 1994.

So, what have the student planners wrought? The West Campus will have ten learning centers, each housing between 90 and 120 students. Each learning center will be a home base, providing maximum flexibility for applied, interdisciplinary learning experiences that will help students achieve goals spelled out in their personal learning plans. Each center has a great hall for performances, large group activities, and student exhibitions; a loft for quiet reading, informal staff and student discussions, and small group discussions; a cooking area for preparing snacks; and construction and art studios for three-dimensional modeling, sculpture, architecture, and set construction.

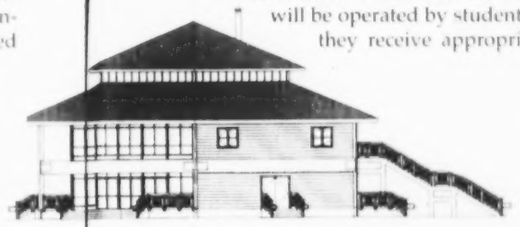
From the beginning, the students' concern for the environment greatly influenced how the entire complex was designed. Brookside will remain a working farm and, together with an Environmental Resource Center, will provide opportunities for all learners to respect and care for the earth. Although agriculture remains an important part of the local economy, a growing number of residents have never been on a farm, so one of the students' goals is to develop a community-wide understanding of farming. The students will help grow fruits and vegetables and sell the products at a farmers' market. They will also monitor the farm's impact on the environment. The site is criss-crossed with ponds and streams for collecting samples that can be examined in the water research lab and the fish hatchery. A barn, greenhouses, and a nursery are all included in the plans.



Conference Center

Students understood that technology is playing an increasingly important role in their lives and wanted to be as technologically literate as possible. Therefore, a state-of-the-art Information Technology Center will become the technology hub for the campus, for the Lincoln district, and for the community. The center will serve as a dynamic information core and gateway that will allow all learners—staff, students, and community—to create, access, evaluate, and use information. Center staff will teach users how to conduct effective research and will assist them in doing real-world projects. An auditorium will be equipped to provide interactive communication with remote locations. We expect this auditorium (together with the conference center mentioned below) will be used by companies for meetings, by teaching staff for professional development activities, and by students for presentations. We are negotiating with a major computer company to establish a training center for computer maintenance and repair.

Students said we need to have tighter links with our community, and looked for ways to make the campus more useful to adults. After conducting a marketing survey, which found that our community lacks adequate spaces for professionals to meet or to conduct training, we decided to include a Conference Center on the site. It will be operated by students after they receive appropriate training. The Conference Center will have a variety of meeting rooms and, in conjunction with the auditorium in the Technology Center, will fill an identified need in the Stockton area.



Student Lodge

Students wanted ways to stay physically fit other than through traditional competitive sports and physical education programs. Therefore, we plan to establish a partnership with a private fitness center to construct a club that will allow students to meet their physical education requirements through a personalized fitness program.

All of these dreams are moving closer to reality. The construction documents have been forwarded to the Department of State Architects for approval, and then bidding can begin for the actual construction. A curriculum steering committee is coordinating the course offerings between the two Lincoln High campuses and identifying new courses that need to be developed. A committee of students and staff is working with the architects on a "Users' Guide" for students, visitors, and staff.

When Lincoln High School West Campus is operational in 1999, a thousand students will be moving daily between the main Lincoln High School campus and the West Campus. Additionally, K-12 students and their teachers from throughout Lincoln district will be involved through workshops and activities conducted by West Campus program students, either through video-conferences or on-site.

"Make it real." Or, as one Lincoln High student wrote us: "If it is my job to learn, then it is your job to teach. Not just math and science and history, but life and pain and sharing and understanding." Powerful messages! We've heard them. We know what they mean. And our students have only begun to imagine...

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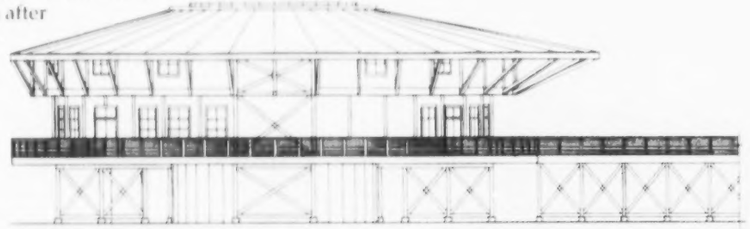

Environmental Center







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# Checking School Design Against the Crystal Ball

*Anne Meek*

An ability to see into the future would be a useful asset in planning a new educational facility. If school planners of the 1960's and 1970's had been able to foresee the personal computer revolution, they could have headed off costly electrical retrofitting and allowed countless more students to enjoy the benefits of information technologies.

As we look into the future, the only sure thing is continuing change in technology and education. How can we avoid making the same mistakes? The following points are offered not as prophecy, but as a way to evaluate your plans against current trends.

**Ensuring Versatility of Spaces.**

Do square footage allocations ensure versatile use of spaces for instruction?

In the first place, ensuring versatility requires adequate square footage. State requirements for square footage are minimums, which are often insufficient for flexible use.

Second, learning activities increasingly take place in three forms: individual, small-group, and large-group—and all three forms may occur within the same classroom at the same time. Therefore, provisions for all three must be included within instructional spaces. What's more, now that students use tools other than papers and pencils, instructional areas should include workshop space and production studios.

Third, storage space has always been at a premium in schools, and the trend towards saving student work for portfolios and exhibitions creates a demand for more storage than ever before. Providing extra storage space in each classroom can prevent clutter and inconvenience.

**Integrating Technology Throughout the Building.**

Do the plans allow for present and future uses of technology integrated throughout the facility?

Conduits and cable trays for electricity, phone lines, and other networking cables should be designed to reach everywhere instructional and administrative efforts may occur. Even when budget considerations prevent installation of an ideal amount of wiring, having the conduits available and accessible can considerably cut the cost of future installations, upgrades, and maintenance. The wiring scheme should support computers in the main classroom spaces, not just against the wall.

Distance learning and multimedia presentations are becoming much more common, so every classroom should be able to serve as a mini-theater, with optimum monitor placement and sound clarity and amplification. The trend towards smaller, more portable, and possibly wireless computers means that schools will need secure storage areas for equipment that is not lent out.

**Providing for Multiple Uses and Users.**

Do the plans allow for multiple uses of school spaces by a variety of community groups?

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Facilities planners must pay careful attention to access, supervisability, and security. Separate outside entrances should be provided for any parts of the building that might be opened to public use, including the auditorium, the gym, and the cafeteria. Basic services—restrooms, concessions, and pay phones—should be readily available in areas intended for public use. Areas not in use need to be secured to prevent unnecessary access. And all areas should be accessible and comfortable for a wide range of people, including those with disabilities.

**Ensuring a Quality Environment**

Will the plans ensure a stimulating and comfortable environment for learning? Will the new school, as a public structure, create feelings of belonging and pride in the hearts and minds of its users?

In our mobile society, with extended families rare, homeless children in abundance, and gangs as substitute families, planners must strive to strengthen emotional attachments to school. Schools should be a home away from home for the people who study and work in them. Economies of scale, as represented in larger school buildings, are misleading, because they make it much more difficult to establish a sense of community. For schools, "smaller is better," according to research by Moore and Lackey.[1] And Crumpacker[2] echoes that a home-like atmosphere fosters an intimate relationship between students and schooling.

All instructional lighting should be variable and adaptable according to purposes. Spot lighting is ideal for learning centers, and rheostats can vary levels of lighting for large-group and small-group activities.

For today's hands-on activities, noise abatement is important. Soft surfaces, adequate square footage for the separation of groups, fabric baffles or fiber art, fountains, and sound-proofing will all help keep distracting sounds to a minimum.

School designers must also provide a flexible HVAC system so the school is comfortably heated and cooled, regardless of the configuration of moveable walls or of the range of activities occurring within. Concerns for energy efficiency should not outweigh the need for adequate ventilation and fresh air, so include windows that open.

Today's teachers, in their roles as coaches, facilitators, and mentors, need spaces for conferring with students, parents, and each other, as well as phones and computer workstations for their planning times. In addition, the presence of growing numbers of volunteers in schools intensifies the demand for additional work and instructional spaces.

**Communicating the Importance of Education.**

Will the new school make a statement about the symbolic importance of education?

As a public building, a school should make a statement about education to the community. The overall facade or appearance of the facility should reinforce the school's function as a safe haven for young people, symbolizing the community's heritage and its aspirations for the future. Planners should invite school partners to donate outdoor sculptures, exterior and interior murals, and displays of historic and cultural artifacts for commons areas. Highly visible art work can celebrate the cultural roots and diversity within the community.

Entryways should invite people in, and clear signage should make the building and grounds easily navigable. The entire building should convey the message that this is an important place, that the place belongs to its users, and that its users belong to the place.

**Connecting Pride in Place to Commitment to Education.**

When students take pride in their school buildings, scene of so many signal memories—first romance, first home run, last years of youth—they transfer their early experiences into emotional bonds with schooling. These deep connections between self and school are the groundwork for economic productivity, the benefits of good citizenship and personal wellness, and joyous lifelong learning.

ENDNOTES

[1]G.T. Moore and J.A. Lackney, "Design Patterns for American Schools Responding to the Reform Movement" in A. Meek (ed.), *Designing Places for Learning* (Alexandria, Va.: Association for Supervision and Curriculum Development, 1995) II-22.

[2]S.S. Crumpacker, "Using Cultural Information to Create Schools That Work" in *Designing Places for Learning*, 31-42.

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# An Oft-Forgotten Factor

**Henry Halsted**

A school is a very special location for experiences that go beyond those provided by curriculum and teaching, important as these are. School is a location for living and growing, for self-realization and attaining personal identity, for creating relationships with others and giving meaning to the lives of those who pass through. School is a location of experiences that will never be forgotten.

When remembering their school days, adults often speak not only of relationships and events, but also of places at school. Places such as:

- The Pioneer Room at Crow Island School in Winnetka, Ill., where students can live out a pioneer family's daily life;
- The "Tree of Knowledge" sculpture, a favorite gathering place for students in the library at Maywood Elementary School in Hammond, Ind.; and
- The theme courtyards representing various periods of local history at Coyote Canyon Elementary School in Rancho Cucamonga, Calif.

These places are magic to children because of the emotions they evoke—wonder, excitement, pleasure, security, fun. They also make possible important growth experiences as students exercise their imaginations and test their behaviors.

Don't forget the motivating power of these unconventional areas that are unique to a school, giving it a special identity, a story of its own. These magic places can be created out of the imagination of each school's community, building on its memories and expectations. They are likely to be the school design elements students will best remember and may, more than any other dimension, color students' attitudes towards their school experience and enhance their capacity to imagine unconventional possibilities.

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*Butler–continued from page 3*

Science areas are designed to allow a seamless flow between actual and virtual lab experiences. Each pair of science labs shares a prep room and a computer room with a computer for every two children. One day the children may be performing an experiment in the lab on acids, the next day they may be using the latest software to explore the impact of pollution on a rain forest.

In the music lab, eight computers with Musical Instrument Digital Information (MIDI) connections to electronic keyboards are laid out in a horseshoe shape. The children are learning everything from reading music, to writing notation, to setting lyrics composed in language arts classes to their own tunes.

Every aspect of the facility was designed to support the work of students and teachers. Classrooms are clustered to encourage interdisciplinary connections. Each room has its own phone console and temperature controls, conveniently located in the front of the room. The classrooms receive plenty of natural light, supplemented by indirect fluorescent lighting, which reduces glare and provides a uniform distribution of light across the room. Extra touches like the indirect lighting and air conditioning have created an environment that is very conducive to learning.

In order to encourage after-hours use of the building, spaces serving both students and the community at large—the theater, the gym, the library, and the cafeteria—are all near the front of the building. This makes it simple to close off the rear-facing area and eases both access and security for after-hours use.

The school, with its bright patterns, vaulted ceilings and bold geometry is clearly a special place and a source of pride to students, parents, and the community. To a city which has its share of urban problems, Butler and the other new schools are very real and tangible indicators that change for the better is coming for the children of Lowell.

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# ACCESS TO INFORMATION

## *Organizations and Networks*

**Children's Environments Research and Design Group** at the University of Wisconsin Milwaukee focuses on improving schools, child care centers, and other children's environments. Services to educators and communities include planning assistance, design consulting, research, and facility evaluation.
Contact: Gary T. Moore, (414) 229-5940;
fax: (414) 229-6976; e-mail: gtmoore@csd.uwm.edu

**The Children's Environments Research Group** at the City University of New York provides assistance to educators in planning learning environments for all children. The center also works on policy issues with government officials and publishes a quarterly journal.
Contact: Selim Iltus, (212) 642-2970;
fax: (212) 642-2971

**The Children, Youth, and Environments Network** is an on-line listserv for educators, architects, and facility planners about preschool through post graduate teaching and learning environments. To subscribe send e-mail to: <LISTSERVE@cunyvms1.gc.cuny.edu>. Leave the subject line blank and in the message line write: SUBSCRIBE CYE-L first-name last-name (e.g. SUBSCRIBE Jane Doe).

**The Council for Educational Facility Planners, International** (CEFPI) supports educators, architects, consultants, and manufacturers in planning, designing, constructing, and/or renovating school environments. CEFPI conducts research, sponsors an annual conference, produces a bimonthly journal, and offers a number of in-house publications on school facilities.
Contact: Tony Wall, (602) 948-2337;
fax: (602) 948-4420

**The Committee on Architecture for Education** of the American Institute of Architects serves architects, educators, and facility planners through regular forums, in-house publications, and a semi-annual newsletter.
Contact: Robert Feild, (202) 626-7418;
fax: (202) 626-7518

**The Center for Architecture and Building Science Research** at the New Jersey Institute of Technology studies the integration of technology in teaching and learning environments. In addition to consultation services, it offers a variety of publications to educators, architects, and facility planners.
Contact: Anton Wolfshorndl, (201) 596-3097;
fax (201) 596-8443; e-mail: wolfa@hertz.njit.edu

**Environmental Design Research Association** (EDRA) is an organization of design professionals, social scientists, educators, and environmental managers who help others understand relationships between people and their surroundings. EDRA has a special network focused on educational facilities.
Contact: Janet Singer, (405) 330-4863 (phone & fax);
email: amsedra@aol.com

**The New American School Design Project** at the Massachusetts Institute of Technology supports the improvement of kindergarten through grade 12 facilities. Serving educators and architects, the project publishes reports, presents design models, and hosts an annual conference.
Contact: Roy Strickland, (617) 253-7334;
fax: (617) 253-8993; e-mail: gargoyle@mit.edu

**The Institute for Environmental Education** at the University of New Mexico designs learning environments and teaches students of architecture and education to understand the relationships between physical environments and learning. It also sponsors service learning projects for schools in which university students share teaching strategies using architecture and design principles.
Contact: Anne Taylor, (505) 277-5058;
fax: (505) 277-7113

**New Designs for the Comprehensive High School** was initiated by the National Center for Research in Vocational Education. The project provides reports, training, and videos showing design concepts to educators, architects and communities.
Contact: George H. Copa, (612) 624-9284;
fax (612) 624-4720

# More Access to Information

## Books

**Building the Future: K-12 Network Technology Planning Guide**, by the California Department of Education, describes the technical issues of planning and implementing network technology in school environments. It includes background information, model schools, and staff development ideas.
Contact: California Department of Education,
(916) 445-1260; fax: (916) 323-0823

**Guide for School Facility Appraisal,** by Harold Hawkins and H. Edward Lilley, helps educators and architects examine six aspects of a school campus: structural and mechanical features, location, building maintenance and upkeep, building safety and security, the adequacy of facilities serving as teaching and learning environments, and the aesthetics of the school.
Contact: The Council of Educational Facility Planners, International, (602) 948-2337; fax: (602) 948-4420

**School Ways: The Planning and Design of America's Schools**, by Ben E. Graves, is a book for educators, architects, and facility planners that offers historical perspectives, design considerations, and future trends related to school facilities. This work contains many useful photographs and illustrations.
Contact: McGraw Hill, New York, NY, (800) 722-4726

**The Seattle Public Schools' School Design Notebook**, by Susan Stuebing, Elisabeth Martin, et al., is a guide for parents, educators, and architects that presents a variety of innovative kindergarten through grade 12 school building designs that foster teaching, learning, and the integration of technology.
Contact: Center for Architecture and Building Science Research, New Jersey Institute of Technology, (201) 596-3097; fax: (201) 596-8443; e-mail: cabsr@hertz.njit.edu

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# EDUTOPIA®

The Newsletter of The George Lucas Educational Foundation

## Letter From the Chairman

We live in an era when astonishing technological advances have become routine and the pace of progress shows no signs of slowing. Consider the stunning growth of the World Wide Web. Just two years ago, the Web consisted of 50 servers used mainly by scientists with access to very powerful computers. Today, the number of sites on the Web is growing by thousands each week, and millions of people browse the Web every day looking for information and entertainment. The promise of instant, unfiltered access to news and information from around the globe is, literally, at our fingertips.

These technological advances have tremendous potential to change the ways we work and live. I no longer have to be on-site during a film production, for example, because I can use video conferencing and high-speed data lines to work with colleagues anywhere in the world. Digital technology allows me to create a wider range of special audio and visual effects, which gives me a much freer hand in telling a story and developing vistas and characters. These tools increase the fun, excitement, and sense of satisfaction I derive from my work and motivate me to push the technology further.

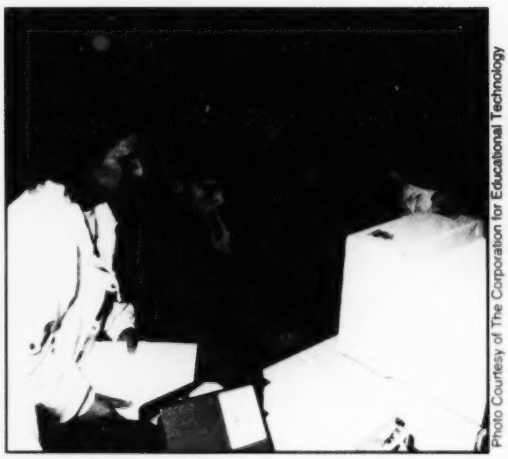

Photo Courtesy of The Corporation for Educational Technology

*Bringing technology home with the Buddy System Project*

Technology places more power in our hands, but it is up to us to decide how to use that power. I'm always encouraged when I hear about people who are using their creativity and influence to promote innovative uses of technology in education. We need these leaders—and more like them—to help make sure that new technologies are used in ways that make learning more exciting and interesting. I know that my passion for learning, experimentation, and personal exploration would have been awakened at a much earlier age had I been able to use the tools that are available today, such as engaging in an on-line treasure hunt for information.

As I have written and said before, we can't afford to let education fall behind private industry in access to and uses of technologies. Our children truly are our future; we don't have the luxury of providing them with less than the best. All of us need to be leaders, working to ensure that all children have access to multimedia and telecommunications technologies like the World Wide Web. We shouldn't settle for anything short of this goal.

George Lucas

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# Edutopia® Update

Since the Foundation was created more than four years ago, our work has been driven by a belief that new technologies offer tremendous potential to improve teaching and learning. We started out by exploring different ways to tap into that potential. As we began talking with educators and leaders in business and technology, we were consistently told that our Foundation could play a more important role in the national debate about how to improve education by helping people understand what innovative, effective education actually looks like.

As a result, our activities now focus on spreading the word about the work that others are doing to improve teaching and learning. We still focus on how the power of technology can best be harnessed in education, but we also champion other education reforms that many believe are critical.

To advance the goal of promoting innovative efforts to improve education, we are currently developing a documentary and a resource book showing what effective education looks like today around the country. As we gear up for production, we are pleased to announce that Gerry Wurzburg, president of State of the Art, Inc., has been chosen to produce and direct the documentary. Ms. Wurzburg and State of the Art, a multimedia communications company based in Washington D.C., have produced numerous films and videos about education. Their credits include *Educating Peter*, a documentary about a child with disabilities and his experience being fully included in a regular classroom, which received an Academy Award in 1993. We are very excited about the insights and experience Ms. Wurzburg and her staff bring to our project.

Much of our work involves talking with people who are involved in various ways to advance the uses of computing and communications technologies in education. This newsletter presents articles about a few of the strategies administrators and policy makers use to promote educational technology. Ken Bird, superintendent of the Westside Community School District in Nebraska, describes how his district won community support for major investments in technology. Lynn Murray, principal of Williston School in Vermont, tells how she models the use of technology to improve communication and gather information to support the school's improvement efforts. Alan Hill, president of The Corporation for Educational Technology, writes about the Buddy System Project, a state-funded project that helps increase parent participation in the learning process. We also reprint the summary from a recent report by the U.S. Office of Technology Assessment that outlines steps others can take to support increased use of technology by teachers. Finally, we offer an assortment of resources that will help you take action on the ideas and issues raised in this newsletter.

As you know, there are many different ways for people to get involved in supporting the integration of technology into teaching and learning. We hope you will look at what your school or community is doing and think about what more you can do to help prepare all students to live in an increasingly complex, highly technological world.

Edutopia® Staff



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# Better Administration Through Technology

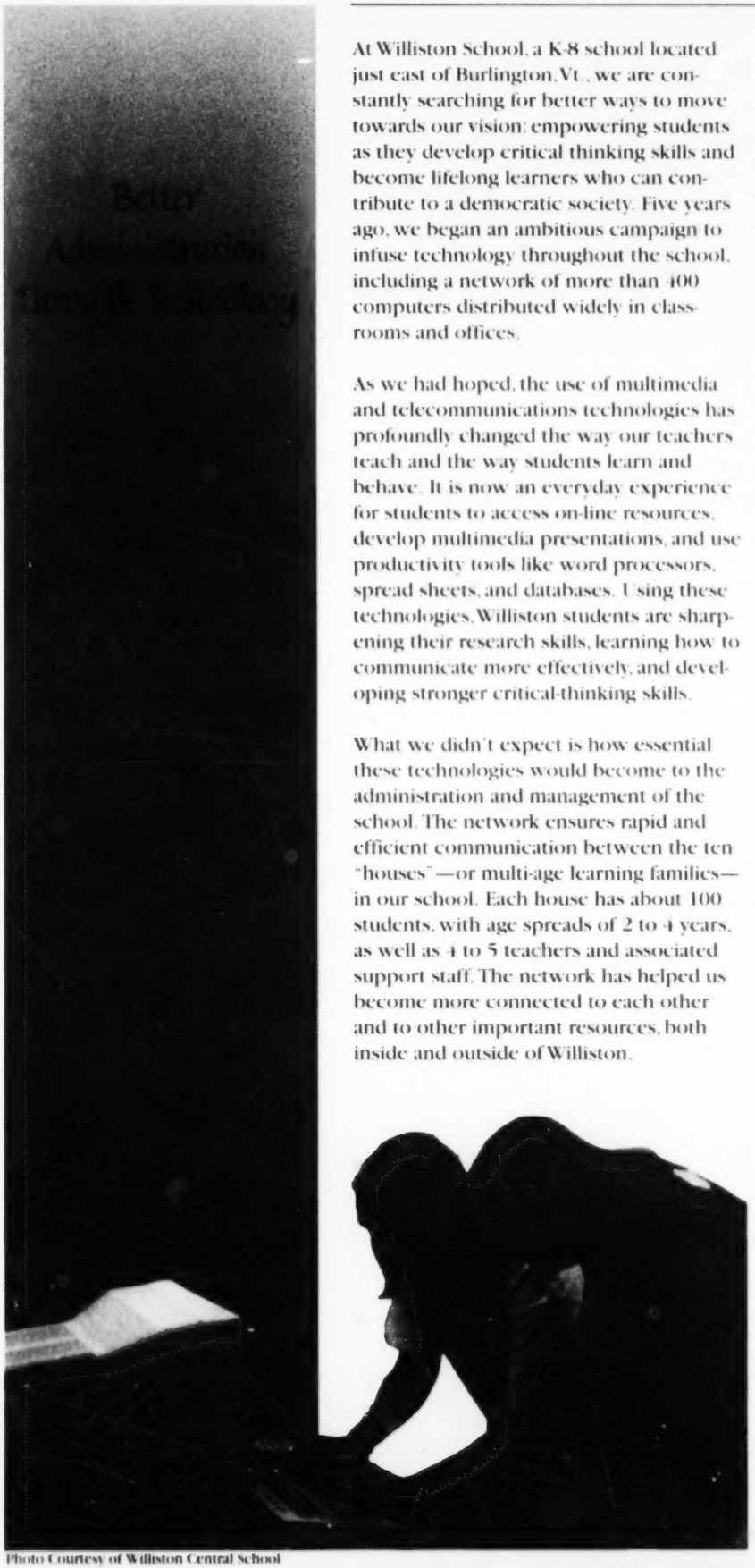

Photo Courtesy of Williston Central School

At Williston School, a K-8 school located just east of Burlington, Vt., we are constantly searching for better ways to move towards our vision: empowering students as they develop critical thinking skills and become lifelong learners who can contribute to a democratic society. Five years ago, we began an ambitious campaign to infuse technology throughout the school, including a network of more than 400 computers distributed widely in classrooms and offices.

As we had hoped, the use of multimedia and telecommunications technologies has profoundly changed the way our teachers teach and the way students learn and behave. It is now an everyday experience for students to access on-line resources, develop multimedia presentations, and use productivity tools like word processors, spread sheets, and databases. Using these technologies, Williston students are sharpening their research skills, learning how to communicate more effectively, and developing stronger critical-thinking skills.

What we didn't expect is how essential these technologies would become to the administration and management of the school. The network ensures rapid and efficient communication between the ten "houses"—or multi-age learning families—in our school. Each house has about 100 students, with age spreads of 2 to 4 years, as well as 4 to 5 teachers and associated support staff. The network has helped us become more connected to each other and to other important resources, both inside and outside of Williston.

The technologies have also had a profound affect on the way I communicate with people and get my work done. As the principal of an innovative school, much of my job involves collecting and communicating information. I am frequently challenged to provide data to the public regarding our new approaches to education. I serve as a liaison to eight very diverse committees looking into a wide range of issues, including curriculum and assessment, discipline, service delivery options, family involvement, school governance, technology, health, and overall school performance. I am also constantly responding to information requests from the school board, the central office, the PTA, and staff groups. As each new issue is raised, I can go on-line and within minutes find relevant, well-organized, relatively jargon-free information digests, articles, vignettes, and opinion pieces. I can quickly point people with questions to available resources, which allows them to carry out their own information searches. When I recently presented an inquiring (and skeptical) school board member with a series of down-loaded articles on interdisciplinary approaches to instruction, it took only a little longer to show her how to access more information on her own. What better way to build trust and knowledge than to step out of the way and give her direct access to information on a topic she really cares about!

I carry a lap-top computer everywhere I go. It is my personal filing cabinet, storing information from all of our planning and input sessions (as well as a full store of articles and background information about the important issues involved in these discussions). Technology helps me create a shared knowledge base among all of the critical actors within the school. Our advisory and decision-making groups have no excuse for not being informed by the very best practices from across the country.

Like our students, I am also able to do better work in less time using software tools like word processors and spread sheets. These tools make it easier to organize information gathered in meetings, as well as background information that connects to the key issues. When

*continued on pg. 10*



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# Promoting Learning at Home: The Buddy System Project Experience

You've heard it all before. Taxpayers and legislators complaining about public education and demanding that schools do more with less. Parents opting for private schools, often at considerable personal sacrifice. Entrepreneurs claiming they could do a better job of teaching our kids, and make a profit in the bargain. Teachers on the verge of burnout, carrying an ever-increasing share of parental responsibilities. Curriculums continuing to expand, with new things piled on top of the old. And, worst of all, pundits who espouse glib answers and quick fixes for complex problems that have evolved in our public schools over several generations.

What you don't hear much about are the exemplary public schools that operate in virtually every region of the country. You don't hear about motivated teachers working with children who are eager to learn, demonstrating results that compare favorably with the very best that private schools have to offer.

What makes these schools work? I have found that you don't need the complex evaluation formulas used by state departments of education to identify good schools. All you have to do is see how many parents are involved in the school—the more parents you see, the better the school is likely to be. Listen to the conversations between parents and teachers; if they are truly listening to and responding to each other, you can be assured your child is in an exemplary environment where children's learning comes first.

When children spend less than 30 percent of their waking hours in schools where student-teacher ratios often exceed 25 to 1, common sense should tell us that most learning is going to occur outside of the formal school day. How, then, do we equip and support children to become active learners outside the classroom, while at the same time encourage parental support and participation in the learning experience?

In Indiana, we have taken a small but meaningful step in this direction by implementing the Buddy System Project, which uses technology to extend learning beyond the classroom and into the home. The project equips families with the same personal computers, printers, and modems found at school, which encourages students to spend more time learning and helps parents develop new links with teachers (and also to the world at large). Started in 1988 with 500 families of 4th graders, Buddy now serves 6,000 families of 4th, 5th, and 6th graders throughout the state and is projected to reach more than 10,000 by 1997.

Study after study shows that children do measurably better in school when their families create a home atmosphere conducive to learning, have high but realistic achievement expectations, and are active in school and community learning programs. Our goal is to foster an environment in which families and educators work together to help learning flourish, both at school and at home. Most children enter the Buddy program with minimal computer skills, yet when they "graduate" to middle school, tests show they are proficient at using word processing, spreadsheet, database, and drawing software; more proficient, even, than computer-literate high school seniors. Their skills are developed while using the computer as an integral part of learning activities occurring in every 4th- and 5th-grade classroom in the state. Teachers can assign complex homework, knowing that

Photo courtesy of The Corporation for Educational Technology

each child has the same tools available as those in the classroom. The result is more time spent on learning at home, as well as the acquisition of information processing skills that permit Buddy Project students to stay a step ahead of their contemporaries throughout their school experience.

Providing the computer hardware for each child's home is only the first step. An intensive staff development program operates year-round for Buddy educators. This year, the Corporation for Educational Technology (CET), the not-for-profit home of the Buddy Project, has partnered with the Indiana Department of Education and Butler University to create a fully-equipped technology training facility for educators and families. Starting this year, the Buddy Project will employ "circuit riders" to travel the state and assist sites by conducting family technology training sessions on evenings and Saturdays. And, over the past two summers, CET has operated a Buddy Leadership Camp for students, parents, and teachers. These camps have provided a healthy combination of outdoor fun and technology. Teams of participants document what they learn during camp by creating multimedia projects using video, graphics, and animation.

After placing computers with families, CET does everything possible to ensure that they don't gather dust in a closet. Statewide licenses have been negotiated with major educational software publishers, and the savings are passed on to Buddy families and teachers. As a result, high-quality educational software is available for purchase by participants at approximately 25 percent of the retail price. To encourage further home use, activity kits in mathematics and language arts (and soon, science) have been created to engage Buddy students and their parents in technology-based projects that directly complement 4th- and 5th-grade curriculums.

Telecommunications is an integral component of the Buddy System Project. A new bulletin board system, accessible to every family via a local telephone call, will be phased in this year. A full-time systems operator is responsible for securing age-appropriate content for the bulletin board and responds to technology questions via a toll-free telephone number or over the network.

Indiana businesses are finding their own ways to support the Buddy initiative. SAM'S Clubs, for example, offer Buddy families the opportunity to purchase their own computer hardware, peripherals, and software at discounted prices, and Fifth Third Bank of Central Indiana provides low-cost, unsecured financing for these purchases.

The CET Board of Directors is made up of leading legislators, educators, business people and parents from around the state who have successfully lobbied for continued and expanded funding for the Buddy Project. Buddy students, parents, and teachers lend their support by traveling en masse to the state house armed with computer exhibits to impress upon lawmakers the impact Buddy has had around the state.

Where does the project go from here? Our focus for the next evolution will be extending our outreach to additional families by leveraging services and support structures already in place. Since more than one-third of U.S. homes are now equipped with personal computers, we are looking for ways to facilitate their use for home-based learning. We are also working with the growing number of free community networks to ensure that support materials and training are available to an ever-widening audience. And as prices for computers continue to drop, we may become a rare example of a program that can realistically do more with less. The project will be testing a sub-notebook machine this year that comes equipped with built in, tool-based software on a ROM chip and sells for under $400.

Using technology to extend learning into the home won't solve all the complex problems affecting the nation's public schools. But the Buddy Project—and programs like it—which enlist parents as partners and provide the tools and support to facilitate learning beyond the classroom, are a giant step in the right direction.

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# Building Community Support for Technology

by

On a recent walk through the halls of our newly renovated middle school, I was struck by the degree to which teaching and learning have changed since I was in the classroom. I saw small groups of students working together and interacting with students thousands of miles away, via the Internet, as they worked at solving a science problem. I saw staff teaching a lesson on Native American culture using resources from the Smithsonian's National Museum of American Arts, a lesson that was made possible by a newly established cooperative technology project. I also saw students sharpening their problem-solving skills as they worked their way through computer simulation activities.

In all these cases, the teachers' role was significantly different than the role I had been trained to fulfill. Teachers were acting as coaches, guides, mentors, and problem solvers; they were not lecturing and did not expect all students to be on the same page in the same book. Although I've heard a lot of rhetoric about how teaching is evolving from fountain of knowledge to facilitator of learning, never before had the transformation been as apparent as it was that day.

It is moments like these that are the payoff for all the time and effort my staff and I have put in over the last several years to build support for interactive multimedia and telecommunications technologies in our district. We're committed to technology as an important component of our overall mission of being "an innovative educational system that ensures academic excellence and serves the unique needs of all learners."

Photo courtesy of the Westside School District

The need to infuse technology into the schools has long been apparent to most superintendents, but facilitating the transition is frequently difficult. Parents and the community have high expectations for quality, but in this era of taxpayer revolts and "back-to-the-basics" attitudes, they may not recognize technology as a vital and dynamic part of providing a high quality education. Yet a recent survey of our district residents revealed that 96 percent support our investment in technology.

How did we generate this kind of support? I believe the answer lies in our multifaceted approach to educating and involving all of the stakeholders in our community, including school staff, the board of education, parents, and members of the community at large. As superintendent, I am constantly seeking ways and means to make sure the rhetoric of our mission becomes a reality in our schools. Talking about how education has changed and how technology can play a positive role in educational transformation has become a part of my daily routine. The goal of this daily discourse is to help all the stakeholders become aware of our vision that technology provides tools to increase our capacity to gather, organize, analyze, and impart information, and that it helps increase learners' abilities in all academic areas as well as areas such as critical thinking, problem solving, communication, and social skills.

I realized early on that successfully transforming the teaching process while integrating technology would require extensive involvement and full support from our teaching staff. So teachers were invited to become actively involved in designing and planning the learning environments in which they conducted their work. We also recognized that the infusion of technology would create a critical need for ongoing staff development, with an emphasis on "on going"—not one-time training opportunities. I took a personal interest in seeing that the necessary resources were in place to provide continuous, "on-the-spot" training and support to all staff. Additionally, all administrators, myself included, are expected to be good role models by using the full scope of technologies in our day-to-day activities.

In order to use technology effectively, teachers have been required to make dramatic changes in how they do their work. Most have made those changes willingly and have worked hard to develop the necessary new skills. As I toured the renovated Westside Middle School recently, I



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was particularly impressed with the "Life Lab," a maze of computer stations where students learn skills for living—somewhat related to what we not so long ago called home economics and industrial arts. I asked about the training of the teachers who were going to be working in this high-tech environment and was politely informed that they were called "facilitators," not "teachers." That is the real essence of the change that technology has required of our teachers. There is no longer any way to teach students everything they will need to know—teachers must instead facilitate students' acquisition of knowledge from the many resources that are available to them through technology.

Another vital component of our technology strategy has been building a sense of need and urgency with the Board of Education. We accomplished this by making technology an integral part of the board's operation, and by giving members the support they needed to facilitate their learning. Our board room was equipped with state-of-the-art presentation equipment. (No overhead projectors allowed!) Frequently, board meetings include presentations by students and teachers, which gives them the opportunity to demonstrate to the board—and to the public—how fundamental technology has become to learning. The board is always amazed at the sophistication of these presentations, and is pleased to see all the parents who have come to watch their children perform. We also connected each board member's home with our district-wide computer network. Their workstations provide instant access to the district's information bulletin board, calendars, and e-mail, as well as access to all of the resources available on the Internet. This active involvement with technology has been a significant factor in gaining and maintaining board support.

We also believe that providing opportunities for community members to use new technologies and experience their value was a key element in our transformation. Our district has a long tradition of active community participation, and we are committed to weaving the fabric of the community and the schools. I was especially concerned about trying to prevent the emergence of a "haves" and "have-nots" situation, in which students from families with technological resources in their homes could gain a considerable advantage over those whose families could not afford such resources. Although we haven't been able to place a computer in every home, we have been able to do some things which have provided greater access to computers for everyone.

One such initiative is the Amber Ridge Family Education Center. The center is located in an apartment complex within the district. Most of the families living in the Amber Ridge Apartments qualify for free school lunches. The center provides a wide variety of services to the families of students who live there, including access to computers. The students use computers for homework assignments and other learning experiences. Adults, too, can use the computers, and training is provided for those who don't have computer skills.

The newly renovated Westside Middle School has been opened to the public in the evenings and on Saturdays. Parents, students, and "empty nesters" take advantage of the school's computers, with students often guiding their parents and grandparents on their first trip down the "information highway."

The Westside Community Education Center is another resource available to the community and staff. Located in a former junior high school that was converted to a community center during a period of declining enrollment, the center provides a wide variety of adult education programs. The facility has a technology center that is used by the staff, by community members, and by local colleges.

It is often said that "the more things change, the more they remain the same." New technologies have helped us move toward better teaching and learning, more challenging roles for teachers, and greater levels of community involvement. Yet none of this would be possible without using the oldest tool available to a superintendent: careful cultivation of relationships with the school board, the staff, and the community. In Westside, all of these stakeholders now recognize that technology is an integral part of society and that it must be part of our schools and the learning process.

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# Excerpt from "Teachers & Technology: Making the Connection"

In the United States, the public school system is designed—ideally—to produce effective, thoughtful citizens who will become valuable contributors to society. In the race to make sure our students are well prepared to handle the world they walk into when they walk out of schools, the nation has tried to enlist as teaching resources the most relevant technological innovations of our time—whether television or telecommunications, calculators or computers. But in the process of equipping our students to learn with technology, a valuable—perhaps the most valuable-part of the education equation has been virtually overlooked: the teachers.

Despite over a decade of investment in educational hardware and software, relatively few of the nations 2.8 million teachers use technology in their teaching. What are some of the reasons teachers do not use technology? What happens when they do use technology? What factors influence technology integration in schools? What roles do schools, districts, states, the private sector, and the Federal government play in helping teachers with new technologies?

As this report will show, helping schools to make the connection between teachers and technology may be one of the most important steps to making the most of past, present, and future investments in educational technology and our children's futures...

Summary of Key Findings

• By spring 1995, schools in the United States (had) 5.8 million computers for use in instruction—about one for every nine students. Almost every school in the country has at least one television and videocassette recorder, and 41 percent of teachers have a TV in their classrooms. Only one teacher in eight has a telephone in class and less than one percent have access to voice mail. Classroom access to newer technologies like CD-ROM and networking capabilities is also limited. While 75 percent of public schools have access to some kind of computer network, and 35 percent of public schools have access to the Internet, only three percent of instructional rooms (classrooms, labs, and media centers) are connected to the Internet.

• Despite technologies available in schools, a substantial number of teachers report little or no use of computers for instruction. Their use of other technologies also varies considerably.

• While technology is not a panacea for all educational ills, today's technologies are essential tools of the teaching trade. To use these tools well, teachers need visions of the technologies' potential, opportunities to apply them, training and just-in-time support, and time to experiment. Only then can teachers be informed and fearless in their use of new technologies.

• Using technology can change the way teachers teach... some teachers use technology to support more student-centered approaches to instruction, so that students can conduct their own scientific inquiries and engage in collaborative activities while the teacher assumes the role of facilitator or coach. Teachers who fall into the latter group are among the most enthusiastic technology users, because technology is particularly suited to support this kind of instruction.

• Increased communications is one of the biggest changes technology offers classroom teachers. Telecommunications, from simple telephones to advanced networks, can transcend the walls of isolation that shape the teaching profession and allow teachers to converse and share experiences with colleagues, school administrators, parents, and experts in the field.

• Helping teachers use technology effectively may be the most important step to assuring that current and future investments in technology are realized.

•Most teachers have not had adequate training to prepare them to use technology effectively in teaching. Currently, most funds for technology are spent on hardware and software, but experienced technology-using sites advocate larger allocations for training and support. On average, districts devote no more then

15 percent of technology budgets to teacher training. Some states have suggested this figure should be more like 30 percent.

• A majority of teachers report feeling inadequately trained to use technology resources, particularly computer-based technologies. Although many teachers see the value of learning about computers and other technologies, some are not aware of the resources technology can offer them as professionals in carrying out the many aspects of their jobs.

• Although schools have made significant progress in helping teachers to use basic technological tools such as word processing and databases, they still struggle with integrating technology into the curriculum. Curriculum integration is central if technology is to become a truly effective educational resource, yet integration is a difficult, time-consuming, and resource-intensive endeavor.

• Technology can be a valuable resource for improving teacher education overall. It can bring models of the best teaching live from the classroom into the colleges of education, or provide video case studies of teaching styles and approaches. It can forge stronger connections among student teachers, mentor teachers in the field, and university faculty.

• Despite the importance of technology in teacher education, it is not central to the teacher preparation experience in most colleges of education in the United States today. Most new teachers graduate from teacher preparation institutions with limited knowledge of the ways technology can be used in their professional practice.

• The federal government has played a limited role in technology-related teacher development compared with states, universities, and school districts. Even so, past federal programs have piloted innovative educational applications of technology for teachers by providing significant support for professional development, specifically among mathematics, science, and special education teachers, and by providing funding for technology-related professional development in school districts that could not have supported it on their own.

• The federal government has tended to focus more on inservice than preservice education, channeling more support to K-12 schools than to colleges of education—an approach that may address current needs but does not greatly influence teacher preparation or quality over the long term.

• ... National leadership for educational technology can create enthusiasm and support for state and local technology initiatives. Focusing attention, as well as funding, on how technologies can support professional development, and on how teachers are essential to the implementation of technologies, can send important signals to schools around the country.

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*Murray—continued from pg. 3*

our Families as Partners Policy group wanted to increase parent involvement in all aspects of the school. I suggested that we begin by finding out more precisely what was already happening. The sub-group assigned this task was able to quickly develop, distribute, and analyze findings from a survey of teachers and parents throughout the system. When they presented their results to the larger committee, we were able to see clearly that many parents and teachers were unaware of the opportunities for—and purposes of—parent involvement. But, at the same time, we were also able to see that there were some stellar models of parent involvement right in our own school. The group decided to write a newsletter to spread the word about the need for more family involvement and to highlight the effective partnerships that were already thriving.

Technology helps us make sure our past experiences and the best available information are always close at hand when we set about to define problems and develop action plans. We often print out minutes from planning sessions immediately after meetings, so there are no delays in moving on to the follow-up actions we have agreed upon.

The tool that my staff and I seem to turn to most often is e-mail. In a school of 1000 children and 150 staff members, communication can sometimes be very cumbersome if you have to rely on paper, meetings, and telephones. With e-mail, messages can be delivered instantly and are available at the convenience of the recipient. As a result, communication within the school has become faster, deeper, and more focused.

My own use of e-mail goes far beyond keeping up with notices about lost and found items, event schedules, and announcements. Recently, for example, I used e-mail to get teacher input on updating our strategic vision. In these turbulent times, we have had a change of school board membership, resulting in less agreement on our key directions. Last summer, the new board began to tackle the daunting task of responding to community criticism, finding common-ground, and re-focusing our directions. They want very much to include teachers and the larger community in these discussions, and I am using e-mail to help the staff become informed and involved. Given the ease of communicating via e-mail, and because this work strikes to our very core, the teachers are responding with wide-ranging and very detailed input. Productivity tools will then help me to amass, organize, and summarize their input to feed back to the school board.

Each day, I process between 30 and 40 e-mail messages as I work with staff and students to facilitate a multitude of decisions and coordinate events throughout the school. Every teacher, assistant, and student is networked on the system, and never very far away from it! I hear from staff and students instantly and often. The questions they ask me, and the things they tell me, keep me tuned to the pulse of the school. I feel much more in touch with what people in and around the school really care about.

Incidentally, e-mail has also become very important to the students—perhaps their most carefully guarded privilege. Remember when we were young and in school, wracked with curiosity about what everyone else was thinking and doing? Remember how much time we spent writing notes to our friends? Now students type notes to their friends both in and outside of the school walls. Each morning, as our students arrive in school, they race to the machines to check their mail and send out new messages.

At Williston, we view learning as an active, creative, socially interactive, lifelong process. The same is true of how I carry out my job as principal. I, too, am constantly learning as I facilitate the transformation and operation of our bustling school. Technology plays a key role in helping me—as well as everyone else in the school—stay informed and communicate clearly so we can focus on keeping our creative energy high.

# Access to Information

Access Excellence is a national education program for high school biology teachers launched by Genentech, Inc. in 1993. Its forum on America Online and the World Wide Web includes downloadable lesson activities and teaching strategies, on-line science seminars, a biotech resource center, and a teachers' lounge of message boards.
Contact: Geoffrey Teeter, (415) 225-8171; Fax: (415) 225-2021; e-mail: teeter.geoffrey@gene.com; AOL: keyword "excellence"; URL: http://www.gene.com/ae

Authentic Assessment Network provides opportunities for educators to share information on the development and implementation of authentic assessment tools. Also available are special forums and a newsletter published three times a year.
Contact: Kathleen Busick, (808) 532-1900; Fax (808) 533-7599; Judith Dorsch Backes, (410) 751-3000; Fax: (410) 751-3003.

*Classroom Connect*—available both in print and electronic formats—is geared especially for teachers and students interested in electronic networking. Each issue profiles resources available on the Internet, guidance for integrating these materials into the curriculum, and a forum for teachers to exchange information.
Contact: Amy Young, (800) 638-1639; Fax: (717) 393-5752; e-mail: connect@wentworth.com; URL: http://www.wentworth.com/classroom/crepub.html

Computer Using Educators, Inc. (CUE) helps K-12 and university educators integrate technology into their teaching and learning. Its network of 23 regional affiliates and six special interest groups in California provides members with grants to integrate technology into instruction, access to conferences and workshops, and opportunities to share information. CUE publishes a bi-monthly newsletter which is distributed worldwide.
Contact: John Vaille (510) 814-6630; Fax: (510) 814-0195; e-mail: cueinc@aol.com; URL: http://www.cue.org/

Educational Products Information Exchange Institute (EPIE) provides educators with evaluations of K-12 textbooks and audio-visual materials, curriculum analysis services, and TESS, The Educational Software Selector, a database of information about available pre-school to college software.
Contact: Ken Komoski, (516) 728-9100; Fax: (516) 728-9228; e-mail: komoski@bnlarm.bnl.gov

The Educational Resources Information Center (ERIC) is a federally-funded national information system that provides access to an extensive body of resources. The ERIC Clearinghouse on Information and Technology (ERIC/IT) is one of 16 ERIC Clearinghouses nationwide providing a variety of services, products, and resources at all education levels.
Contact: (800) LET-ERIC; Fax: (202) 219-1817; URL: http://ericir.sunsite.syr.edu/

Florida Information Resource Network (FIRN) electronically connects Florida's public education community. FIRN provides access to administrative computing services as well as electronic mail and the Internet.
Contact: Bill Schmid, (904) 487-0911; Fax: (904) 488-3691; e-mail: schmidb@mail.firn.edu; URL: http://www.firn.edu

Indiana Department of Education Access Network (IDEAnet) is a statewide, toll-free, dial-up telecommunications system for educators, students, and parents. IDEAnet provides access to databases, a bulletin board/conferencing system, and electronic mail.
Contact: Cathy McMasters, (317) 232-0808; Fax: (317) 233-6326; URL: http://www.doe.in.us

*Journal of Technology and Teacher Education* presents the latest research and practices for integrating technology into both preservice and inservice teacher education. Issues range from the role of electronic networking in professional development to profiles of technology-infused teacher preparation programs.
Contact: (804) 973-3987; Fax: (804) 978-7449; e-mail: aace@virginia.edu

Learning and Information Networks for Community Telecomputing (LINC) helps communities develop locally run, cooperative telecomputing networks. Their goal is to achieve community-wide, equitable access to computer technology, training, information, and lifelong learning.
Contact: Ken Komoski, (516) 728-9100; Fax: (516)07 28-9228; e-mail: komoski@bnlarm.bnl.gov

National Diffusion Network's (NDN) mission is to improve education by sharing information about effective programs in schools and districts around the country. Each year it publishes a catalogue of exemplary programs and supports state facilitators and program developers who assist in program implementation across the country.
Contact: Teri Ivey, (202) 219-2134; Fax: (202) 219-1407; e-mail: tivey@inet.ed.gov

National Parent Information Network (NPIN) provides information to parents and those who work with them. Among the materials available are relevant articles, a question answering service, descriptions of innovative programs, and "Parent News," an electronic report on timely issues related to parenting and child development.
Contact: Amy Aidman, (217) 333-2386 or (800) 583-4135; Fax:(217) 333-3767; e-mail: cesarone@uiuc.edu; URL: http://ericps.ed.uiuc.edu/npin/npinhome.html; Gopher: ericps.ed.uiuc.edu

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National Education Association (NEA) Center for Education Technology works on policy issues generated by the uses of technology in schools and homes, as well as acts as a clearinghouse for NEA members. The center provides information from a wide variety of sources.
Contact: Barbara J. Yentzer, (202) 822-7360; Fax: (202) 822-7987; e-mail: edtech@aol.com

Plugged In is a non-profit computer center providing a broad range of educational technology programs. Primarily serving East Palo Alto, Calif., Plugged In makes all of their curriculum materials, student work, and organizational information available on the WWW, thus reaching many more communities around the world.
Contact: Bart Decrem, (800) 225-PLUG; Fax: (415) 332-6147; e-mail: webbed@pluggedin.org; URL: http://www.pluggedin.org/

The Teacher Education Internet Server focuses on the integration of telecommunication technologies with teacher education programs. Connections to Gophers and on-line discussion groups provide users with strategies for linking technology to subject matter, access to electronic journals, and other Internet resources pertinent to teacher education.
Contact: Bernard Robin, e-mail: brobin@uh.edu;
URL: http://curry.edschool.virginia.edu/teis/

*Teacher Talk*, published by Indiana University, is the first journal of its kind devoted exclusively to those individuals preparing to become secondary teachers. Published three-times yearly in both electronic and print formats, it features interviews with veteran and beginning teachers, advice on classroom management and instructional strategies, and in-depth articles meshing theory and practice with current issues in education.
Contact: e-mail: ADOL@indiana.edu;
URL: http://educate.educ.indiana.edu/cas/tt/tthmpg.html

U.S. Department of Education (U.S. D.O.E.) WWW Server maintains links to a wide variety of education materials. A new "Search" feature helps users navigate through the entire U.S. D.O.E. Web and Gopher collection, which includes teacher and researcher guides, publications, and initiatives of the U.S. Secretary of Education. Access to other databases is available as well.
Contact: Keith Stubbs, (202) 219-1547; Fax (202) 219-1817; e-mail: webmasters@www.ed.gov; URL: http://www.ed.gov/

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